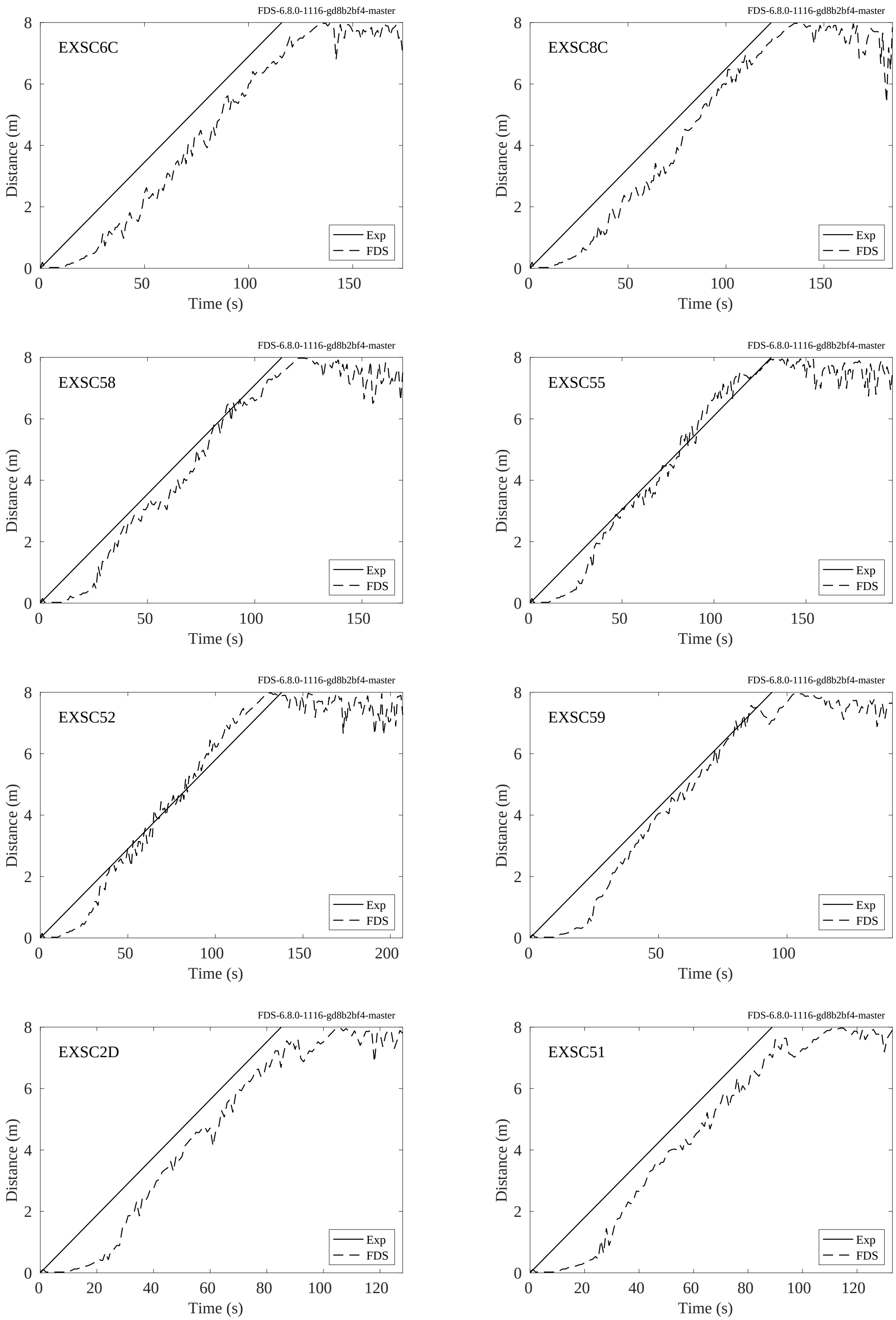


Figure 14.84: Flame front, USFS/Catchpole experiments

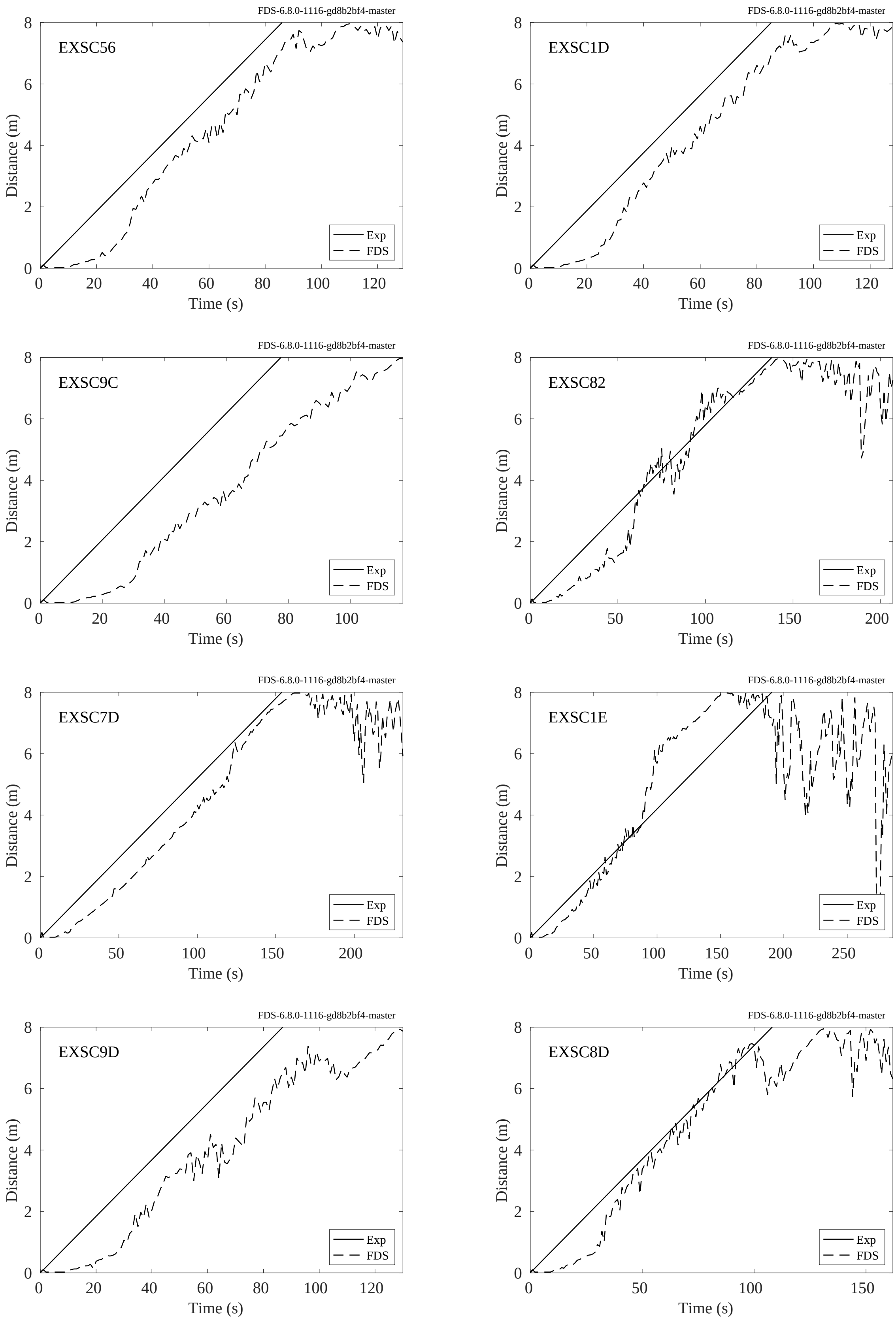


Figure 14.85: Flame front, USFS/Catchpole experiments

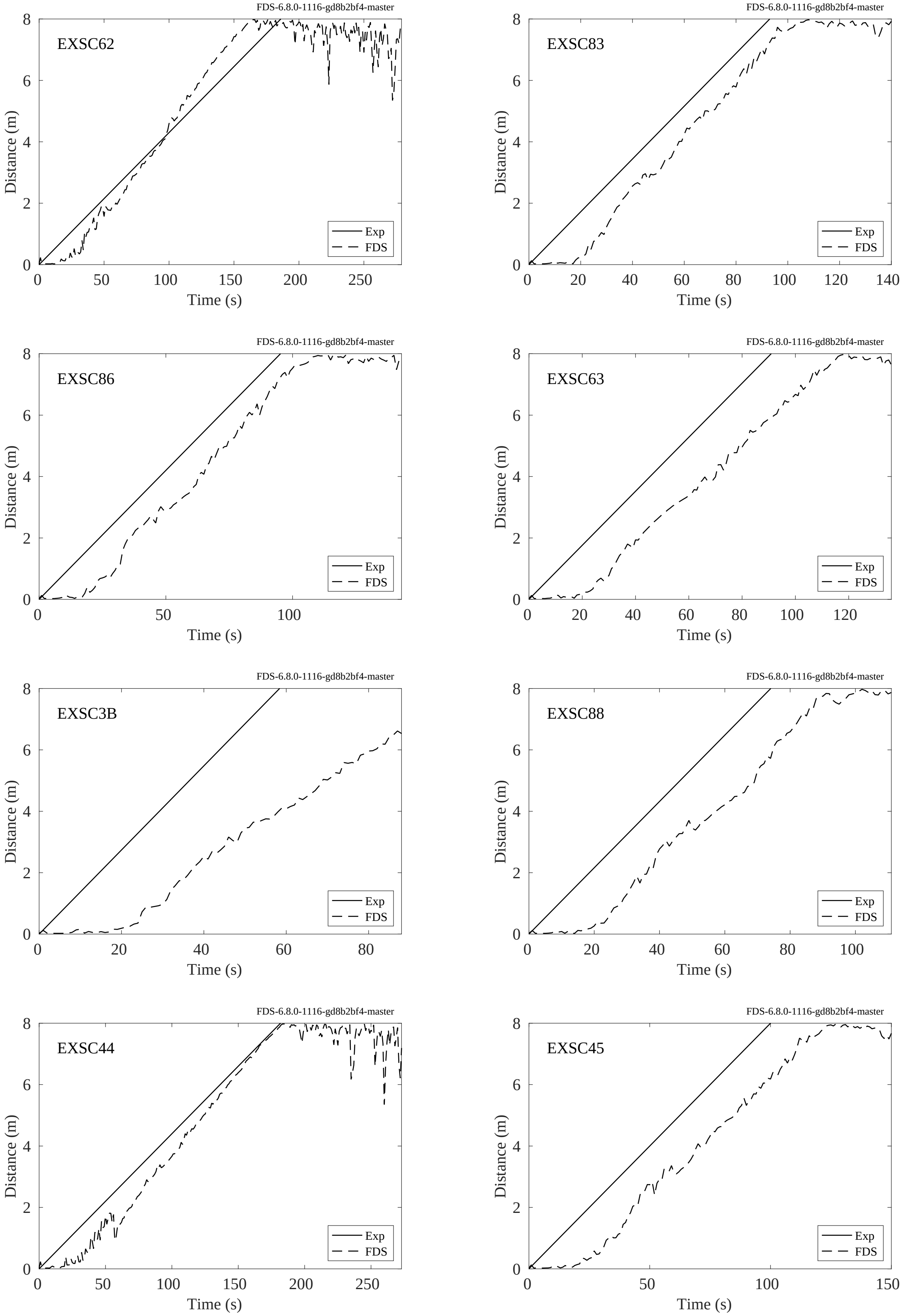


Figure 14.86: Flame front, USFS/Catchpole experiments

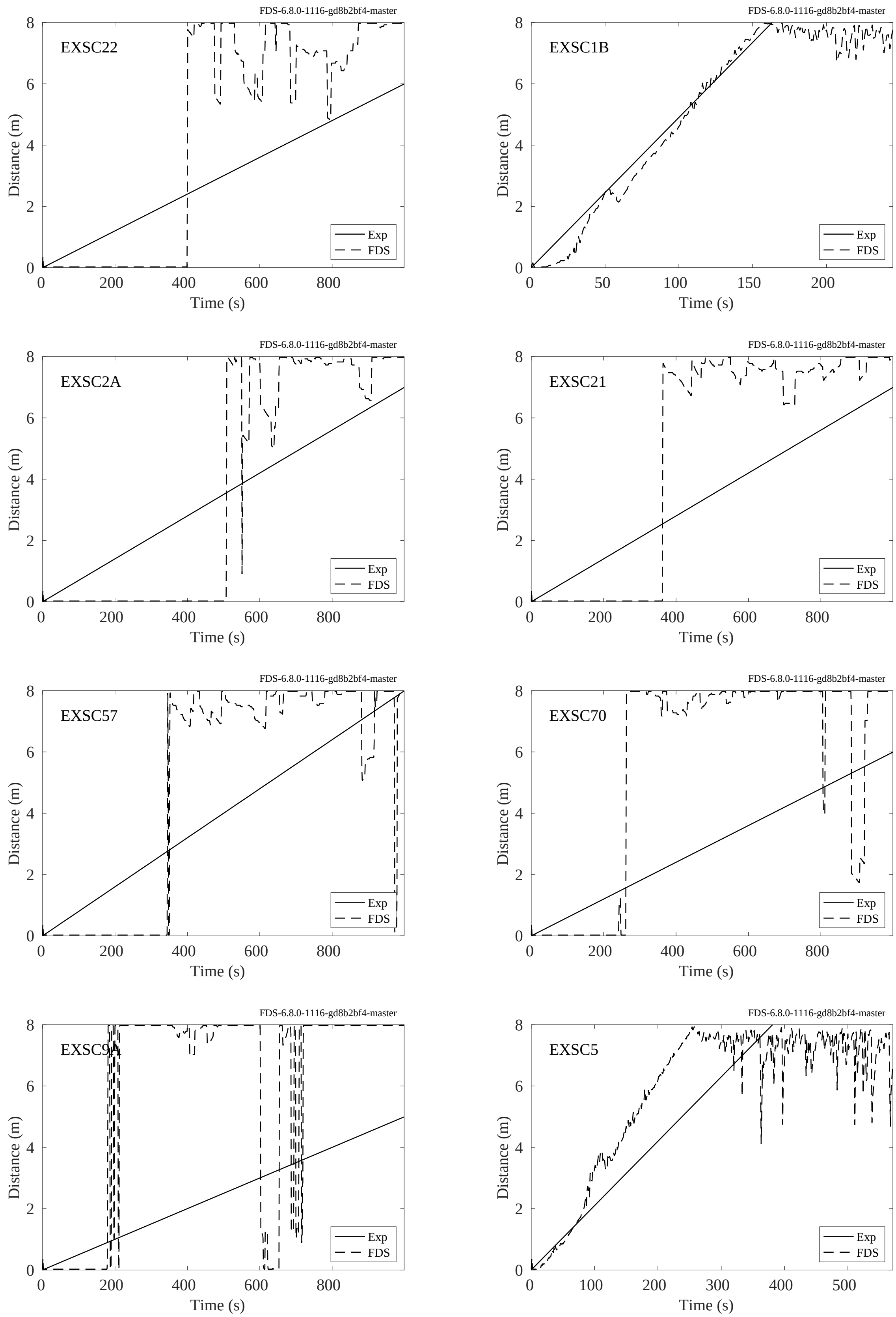


Figure 14.87: Flame front, USFS/Catchpole experiments

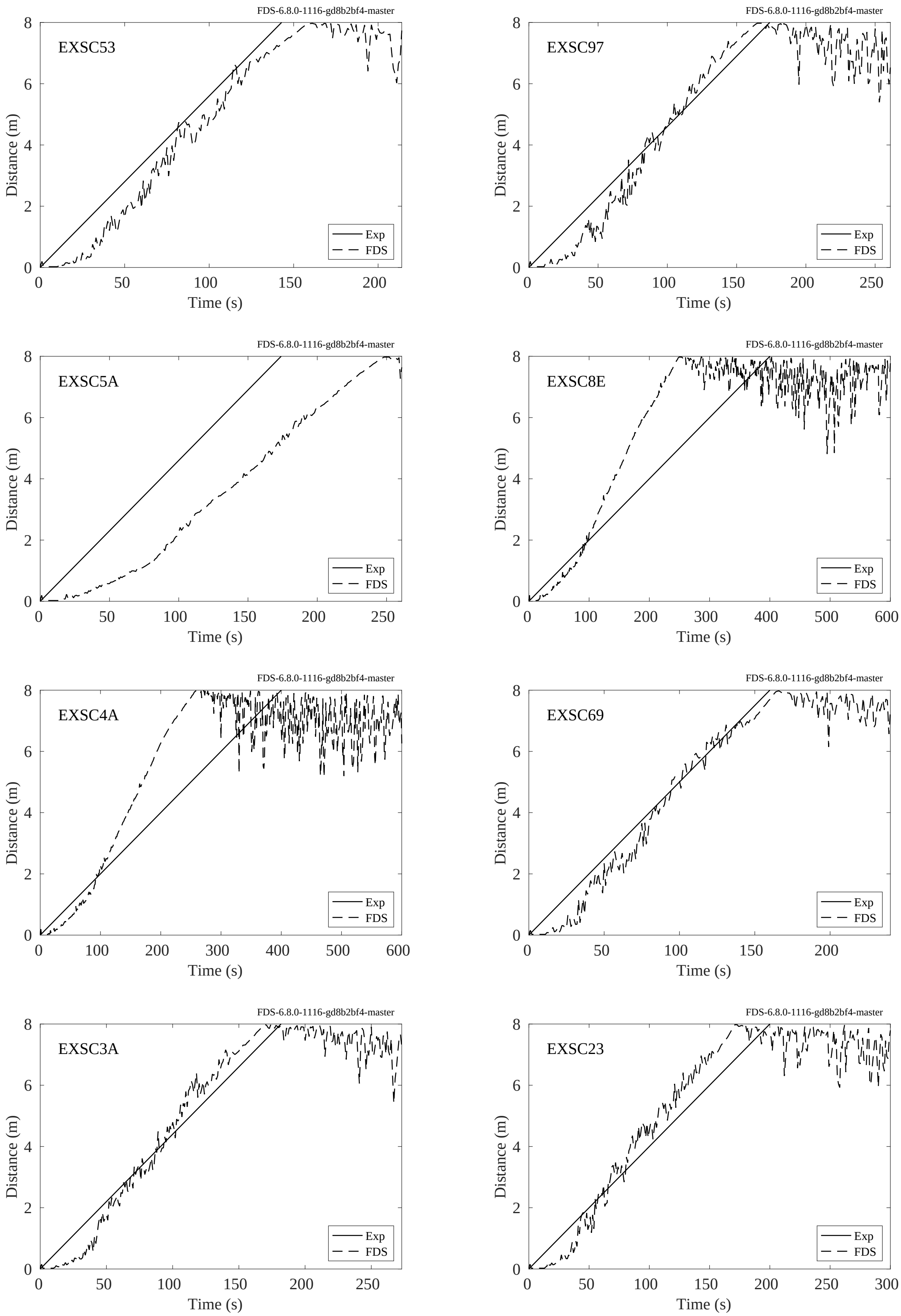


Figure 14.88: Flame front, USFS/Catchpole experiments

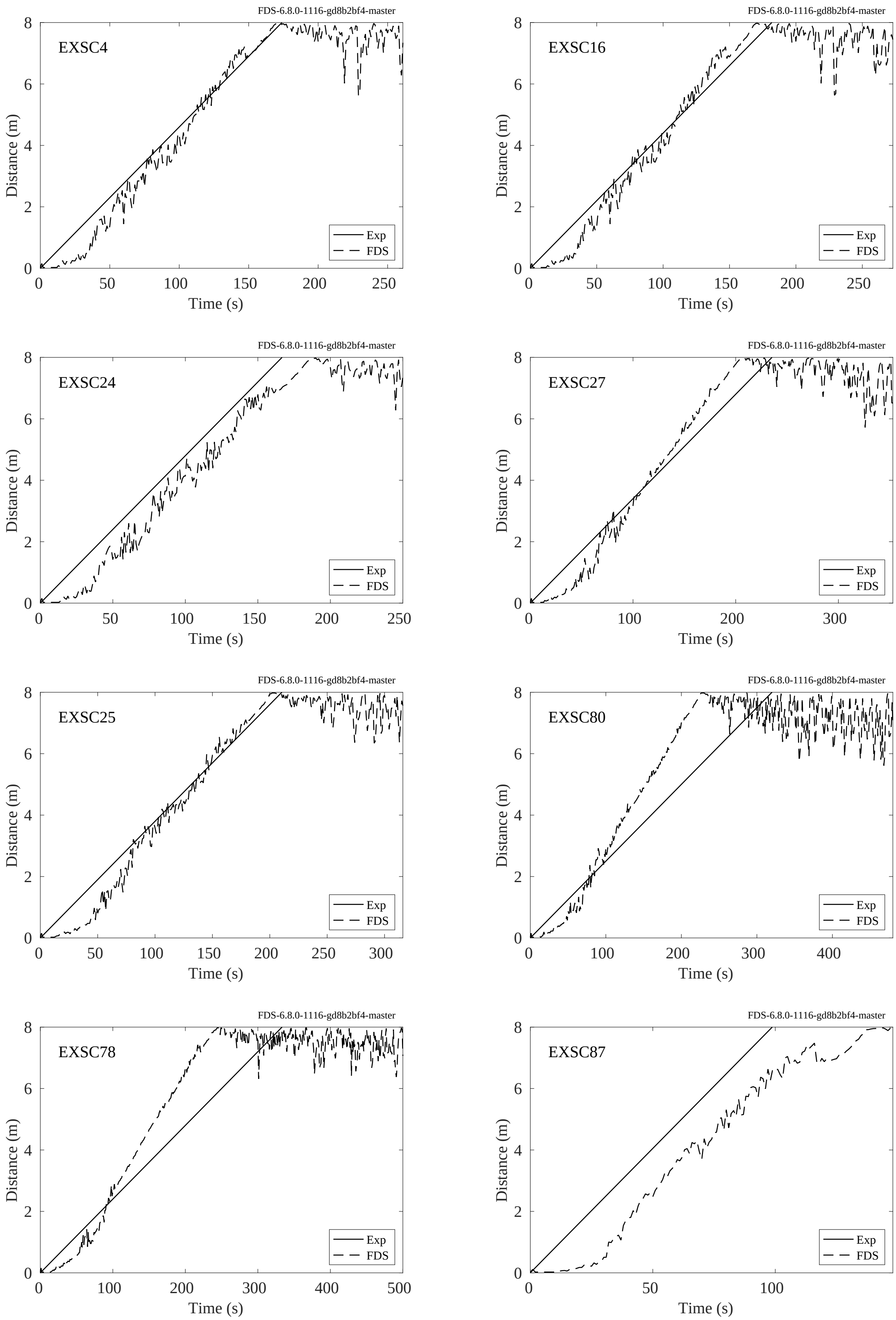


Figure 14.89: Flame front, USFS/Catchpole experiments

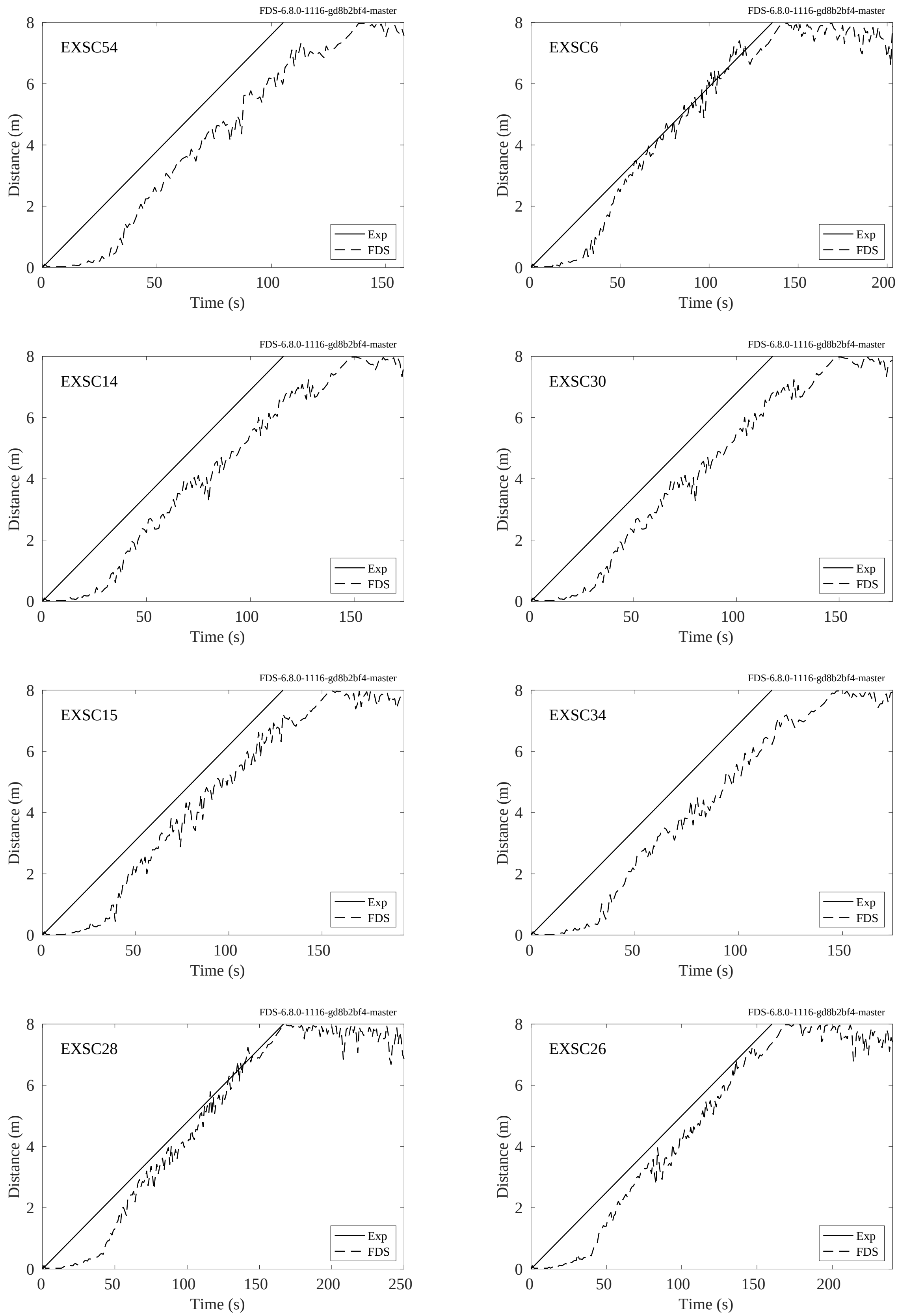


Figure 14.90: Flame front, USFS/Catchpole experiments

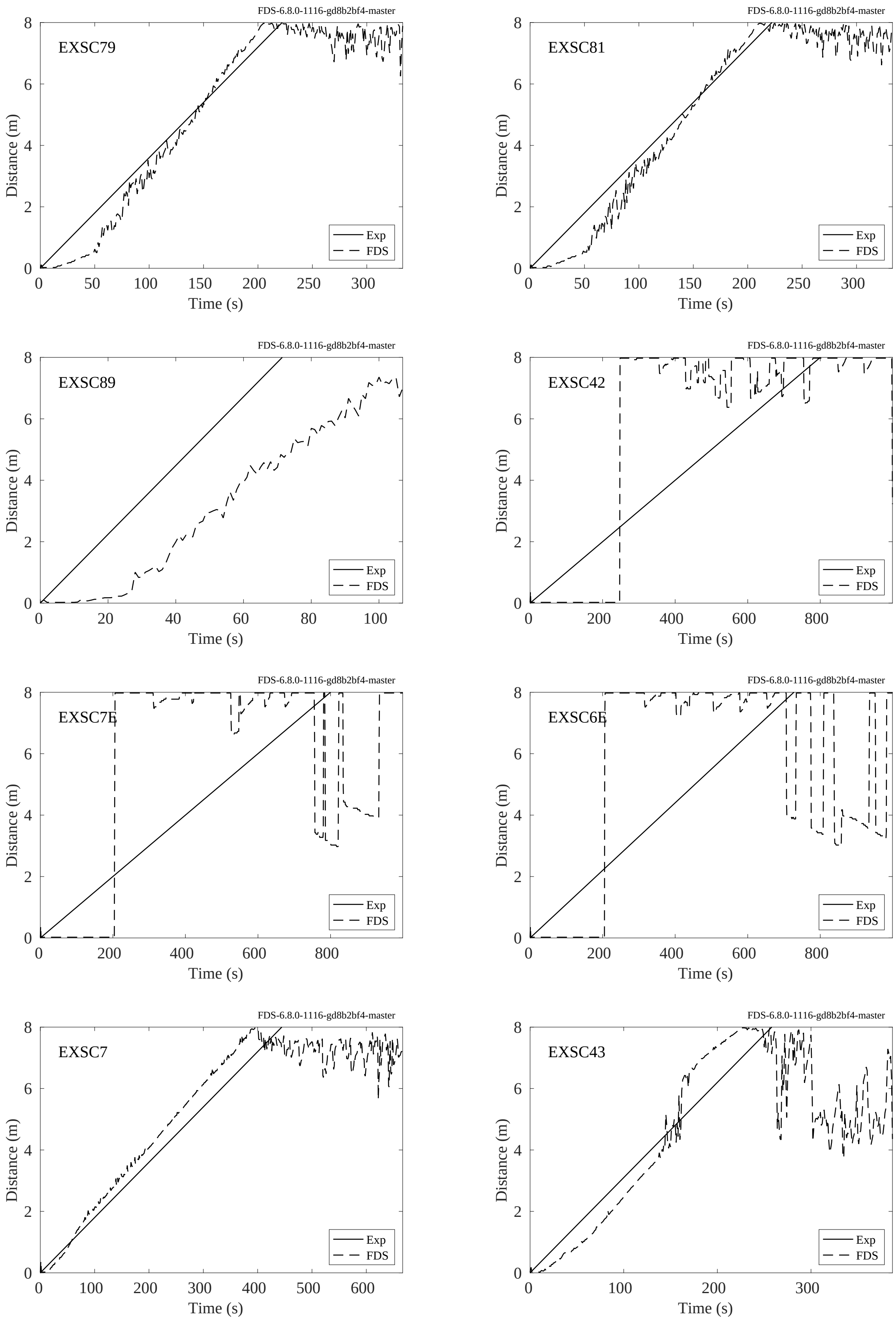


Figure 14.91: Flame front, USFS/Catchpole experiments

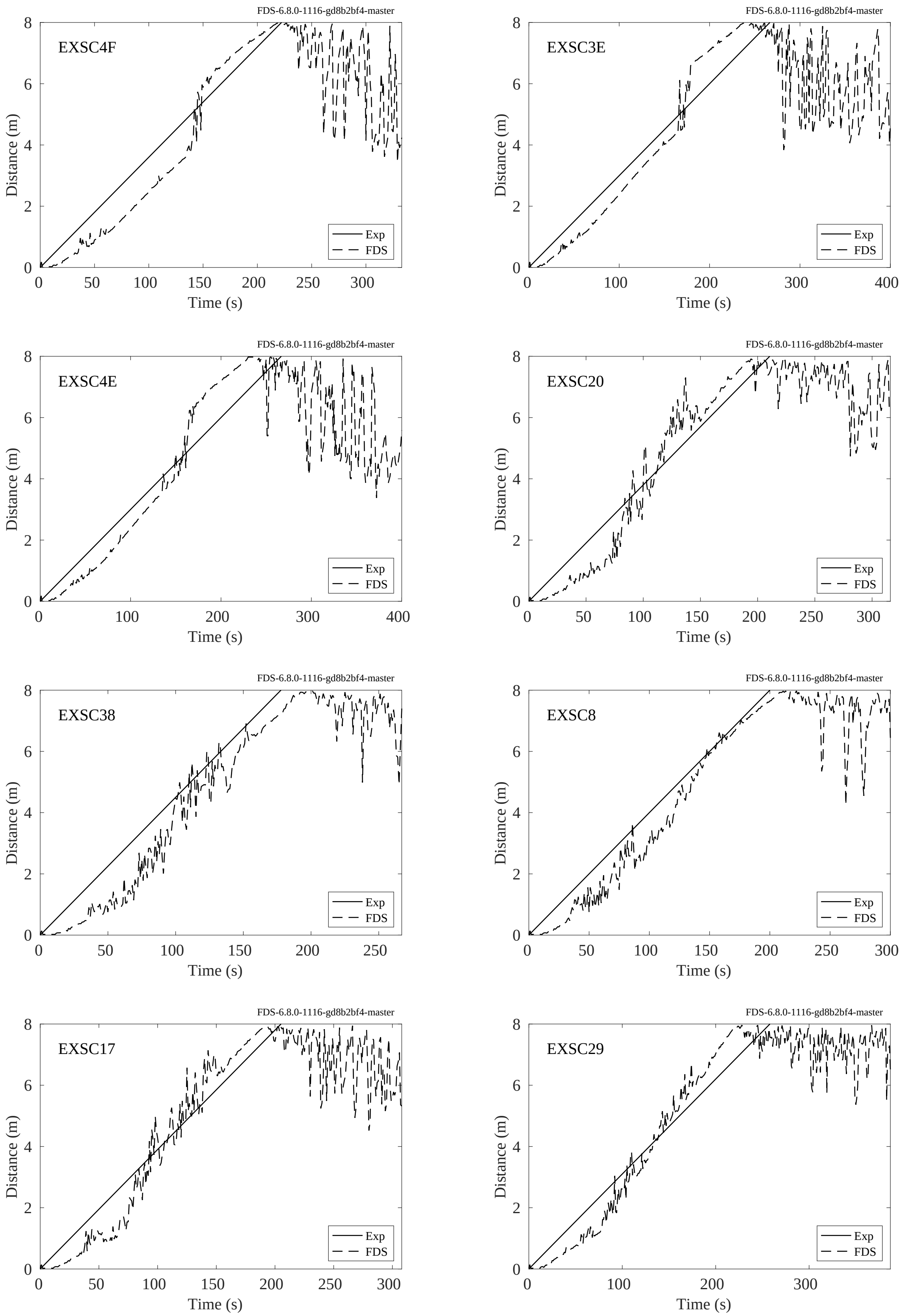


Figure 14.92: Flame front, USFS/Catchpole experiments

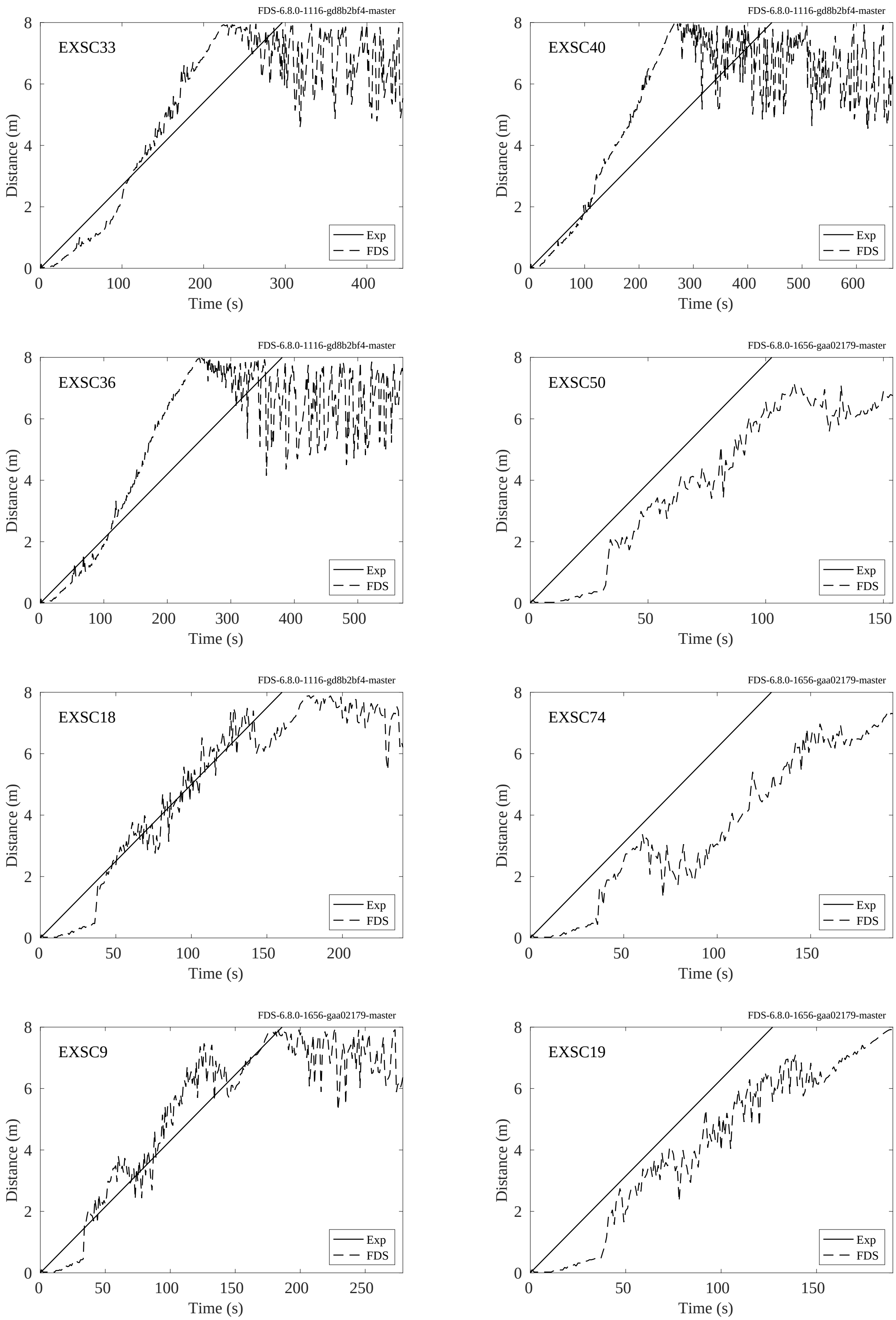


Figure 14.93: Flame front, USFS/Catchpole experiments

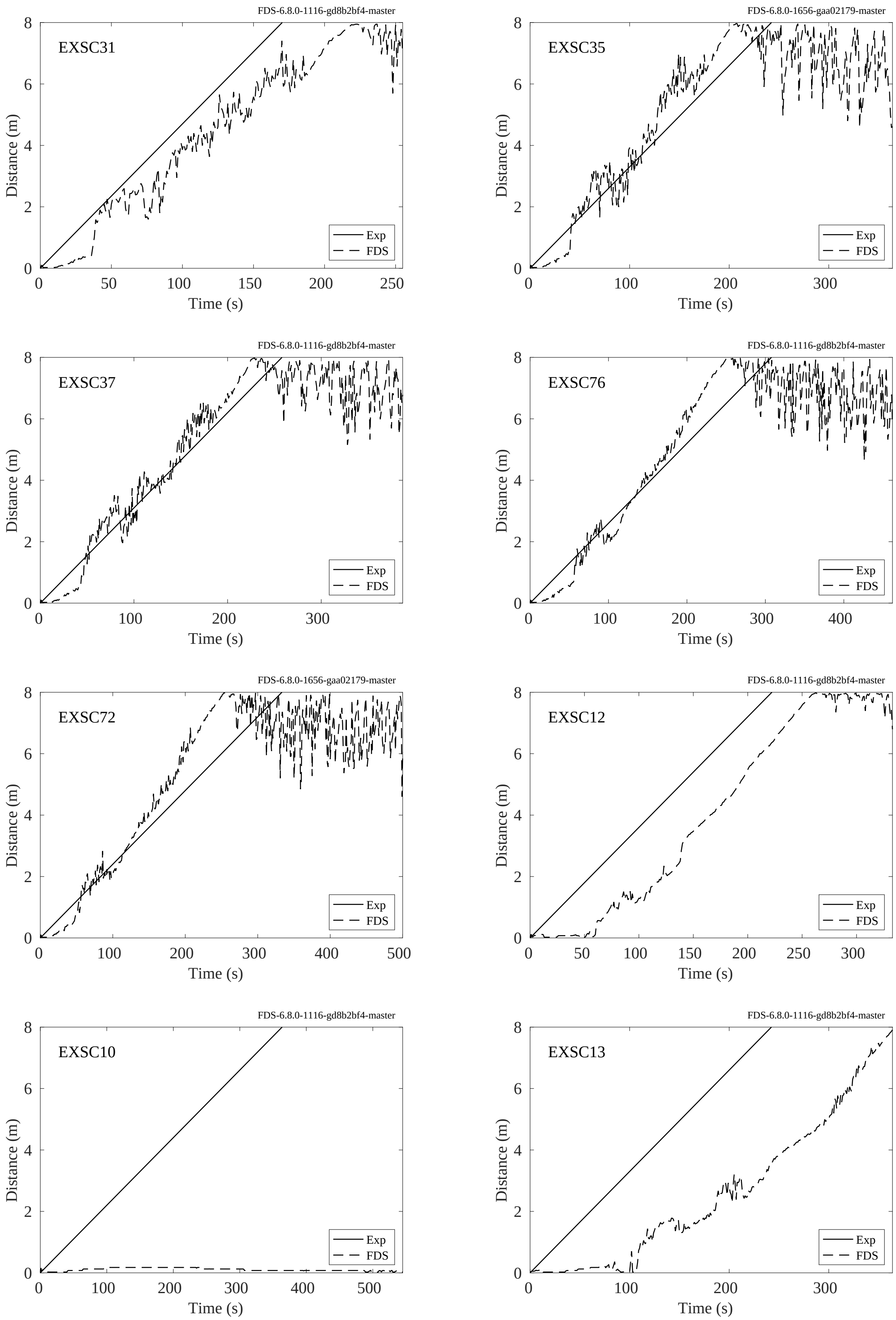


Figure 14.94: Flame front, USFS/Catchpole experiments

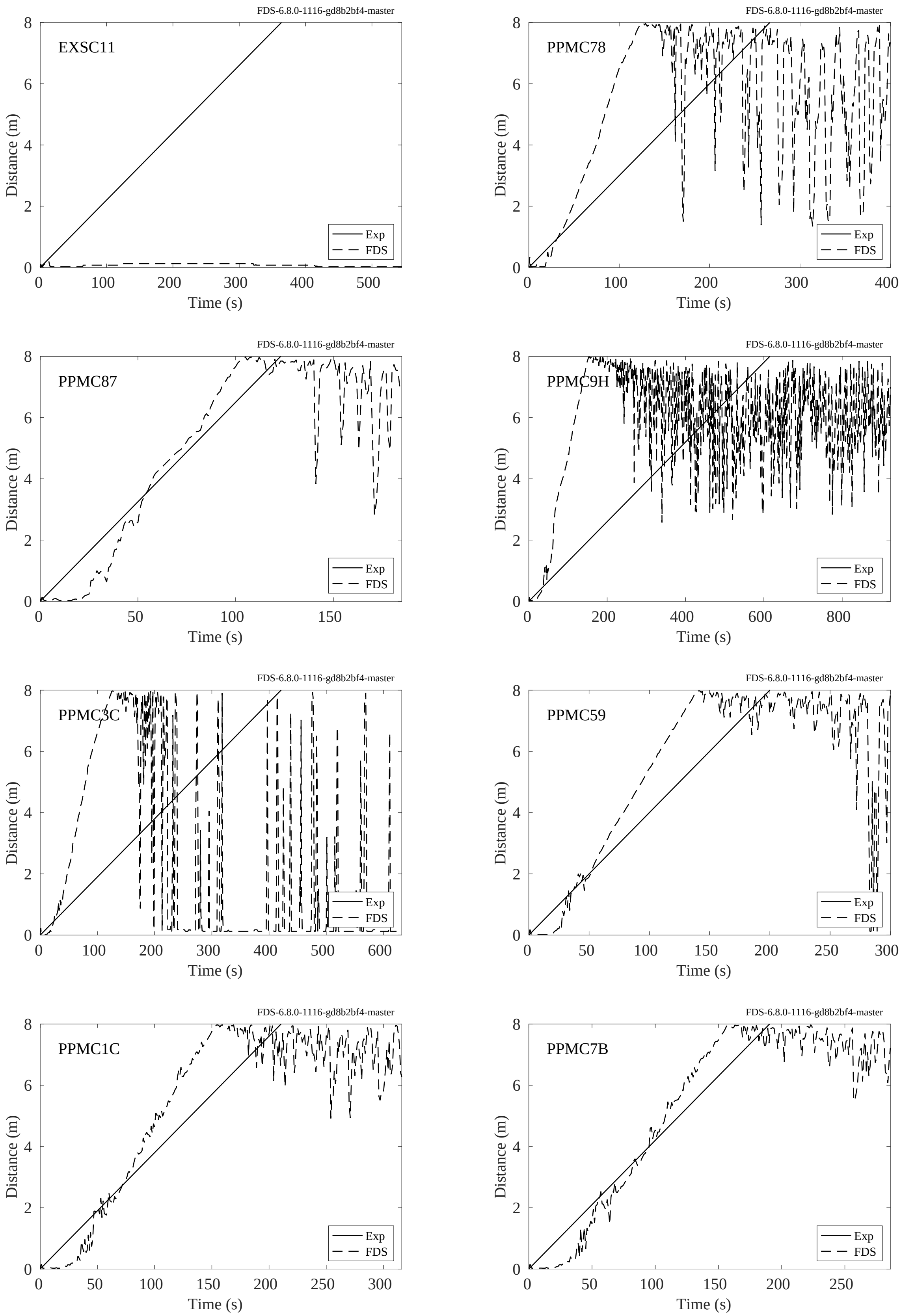


Figure 14.95: Flame front, USFS/Catchpole experiments

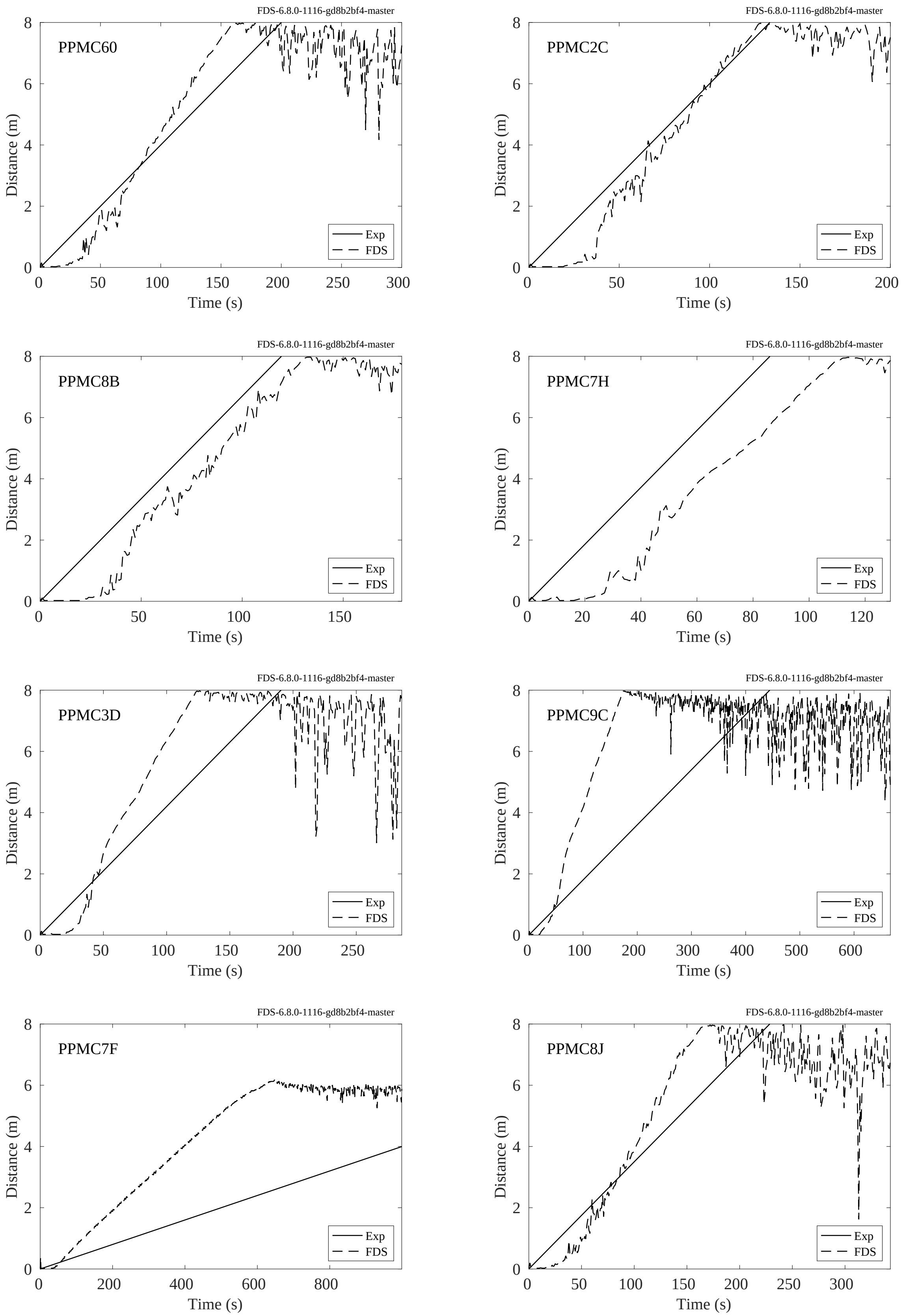


Figure 14.96: Flame front, USFS/Catchpole experiments

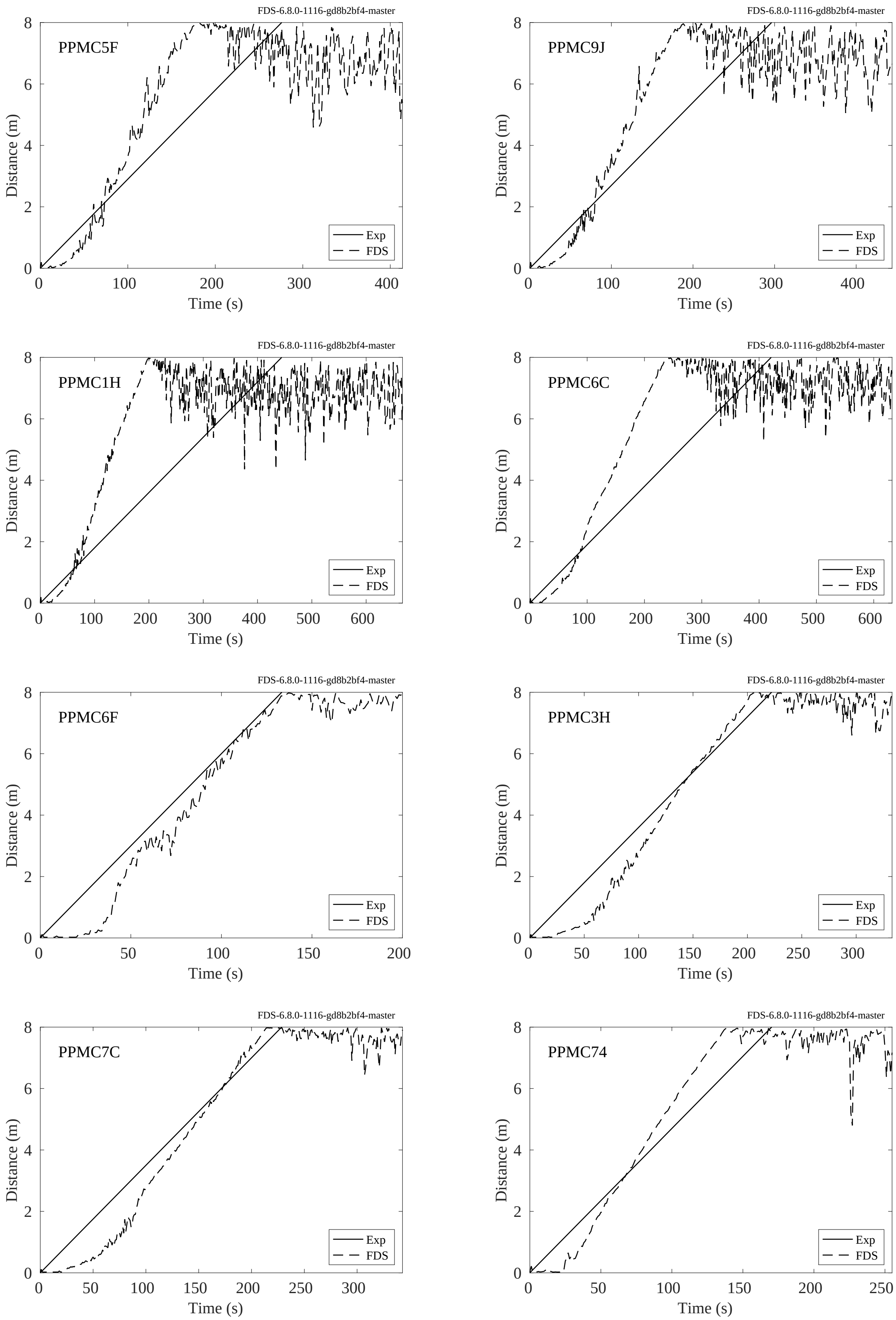


Figure 14.97: Flame front, USFS/Catchpole experiments

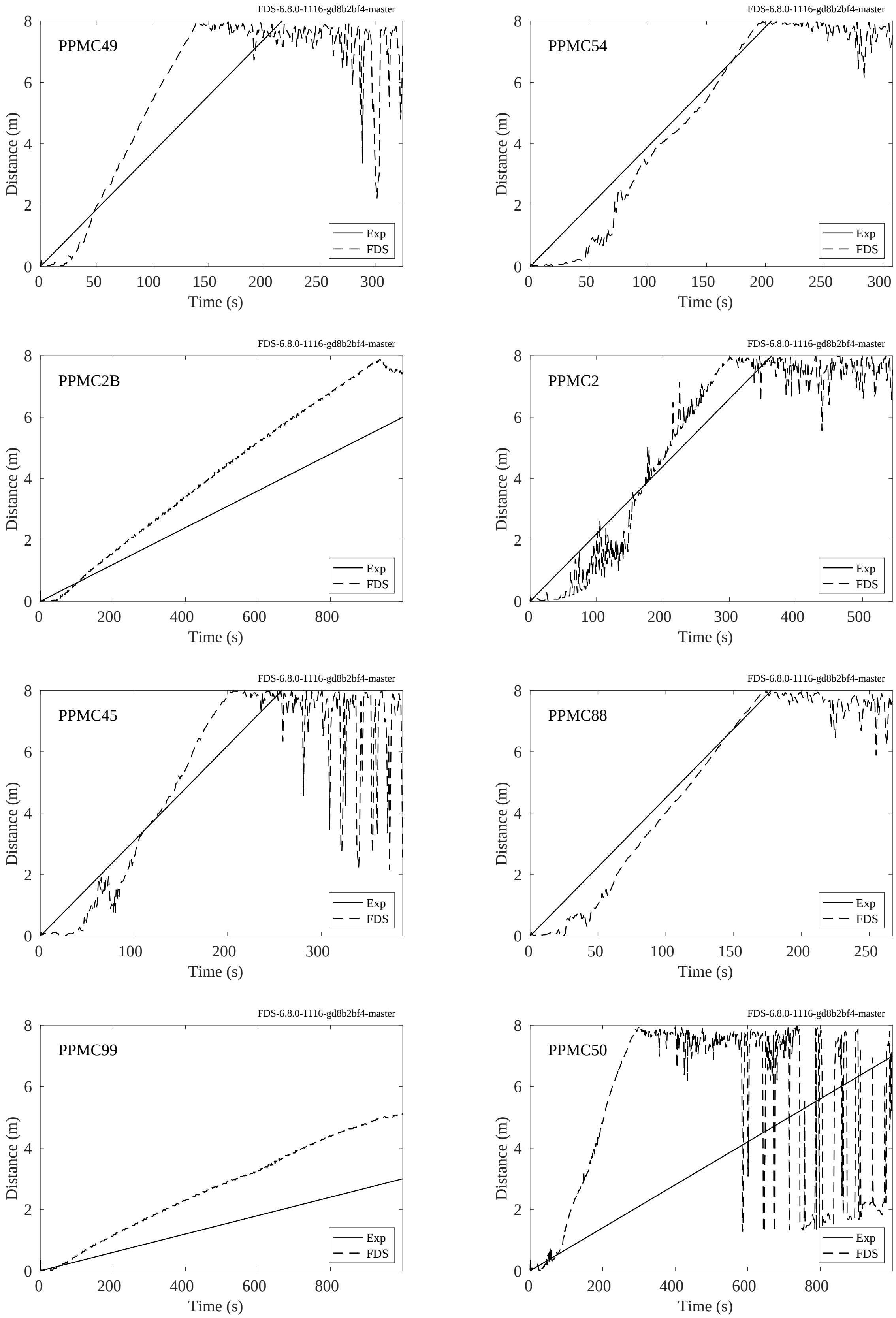


Figure 14.98: Flame front, USFS/Catchpole experiments

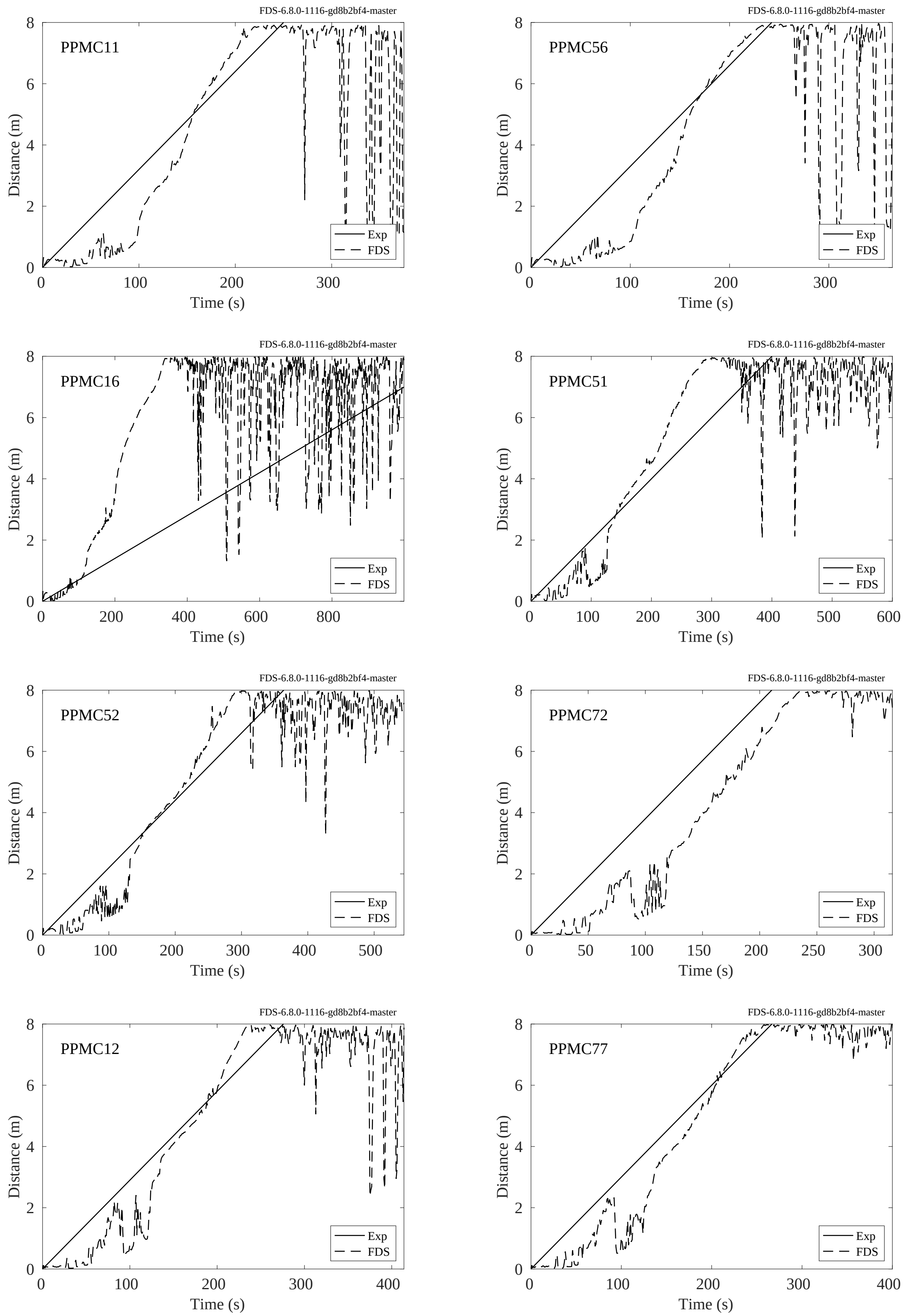


Figure 14.99: Flame front, USFS/Catchpole experiments

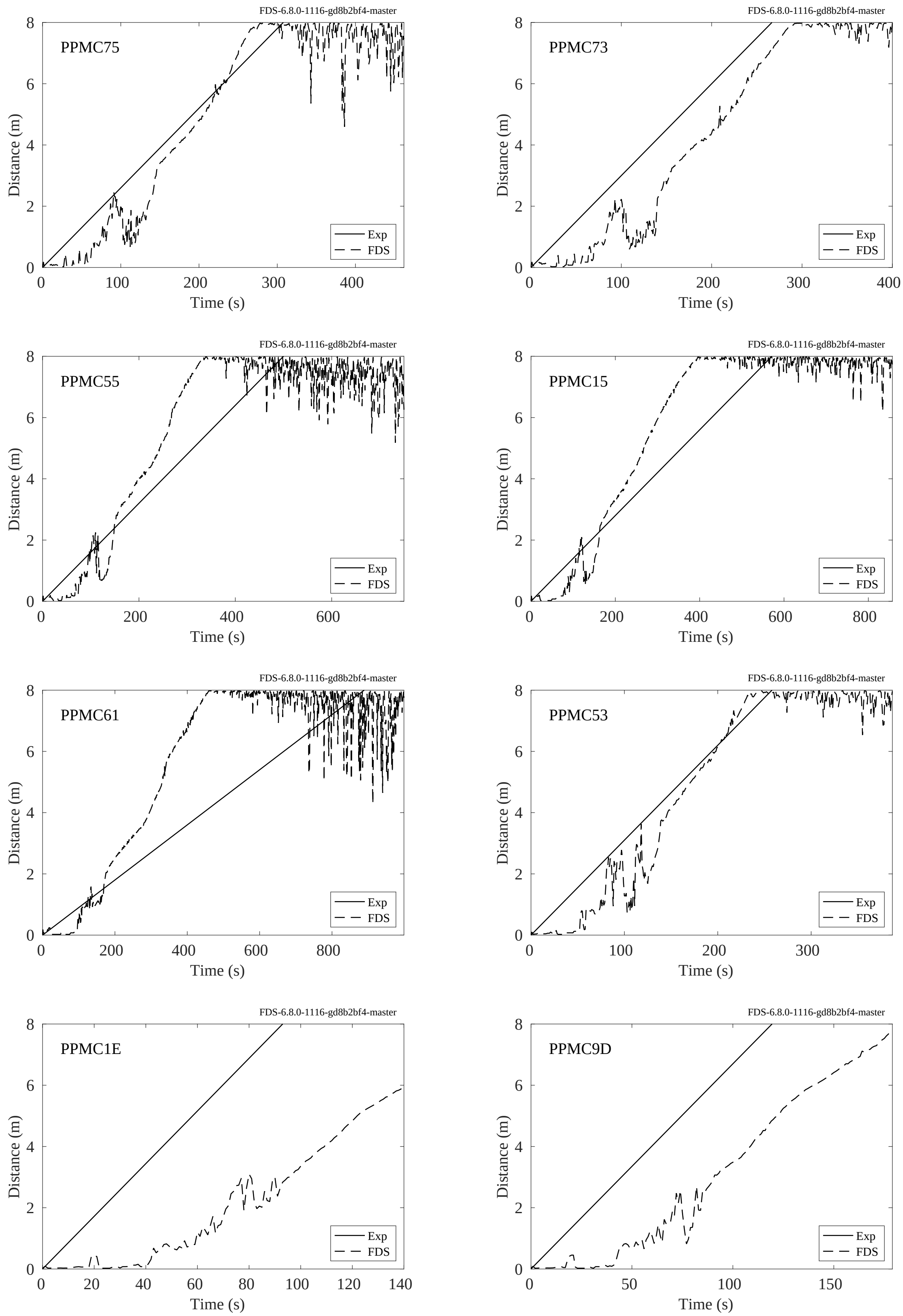


Figure 14.100: Flame front, USFS/Catchpole experiments

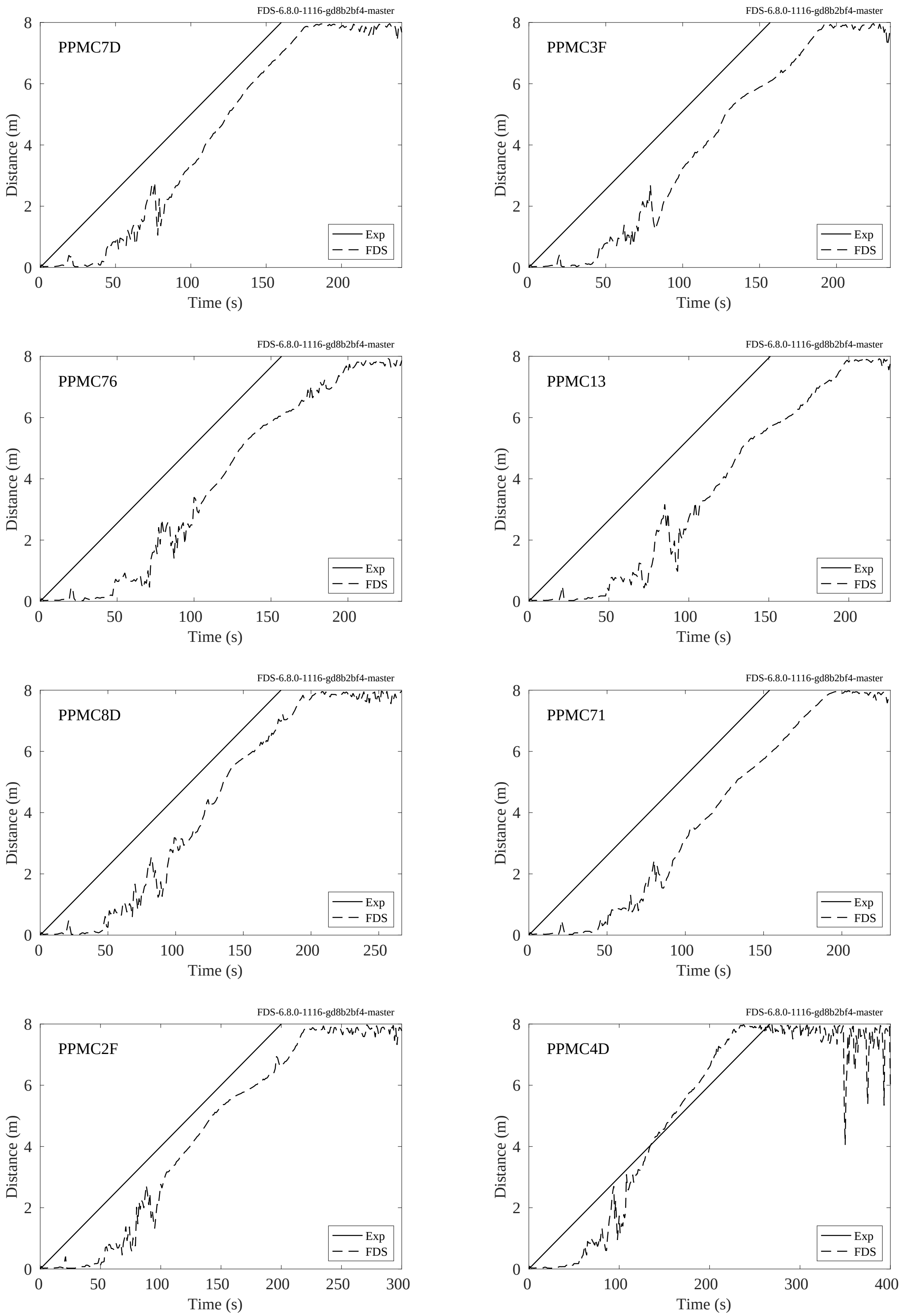


Figure 14.101: Flame front, USFS/Catchpole experiments

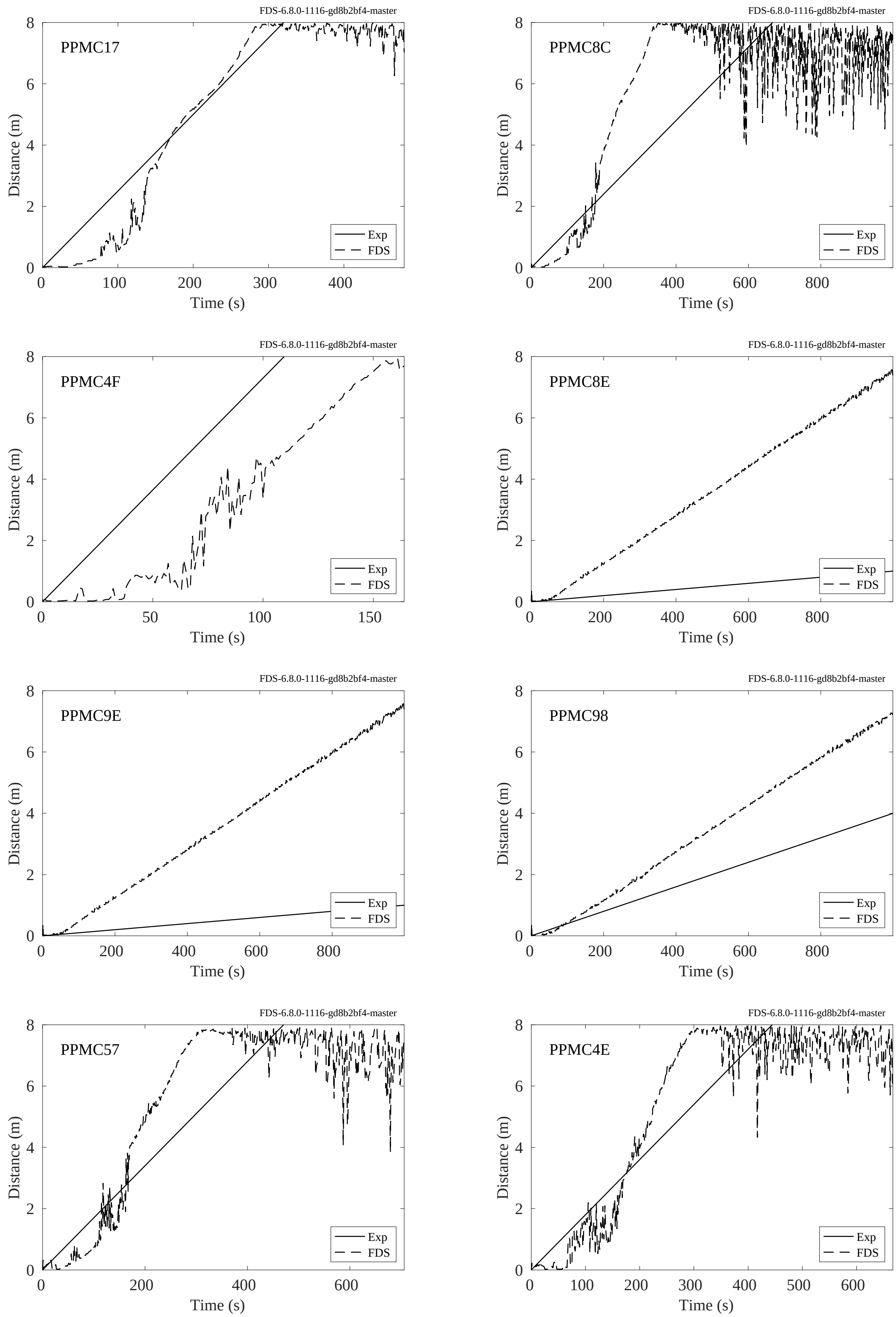


Figure 14.102: Flame front, USFS/Catchpole experiments

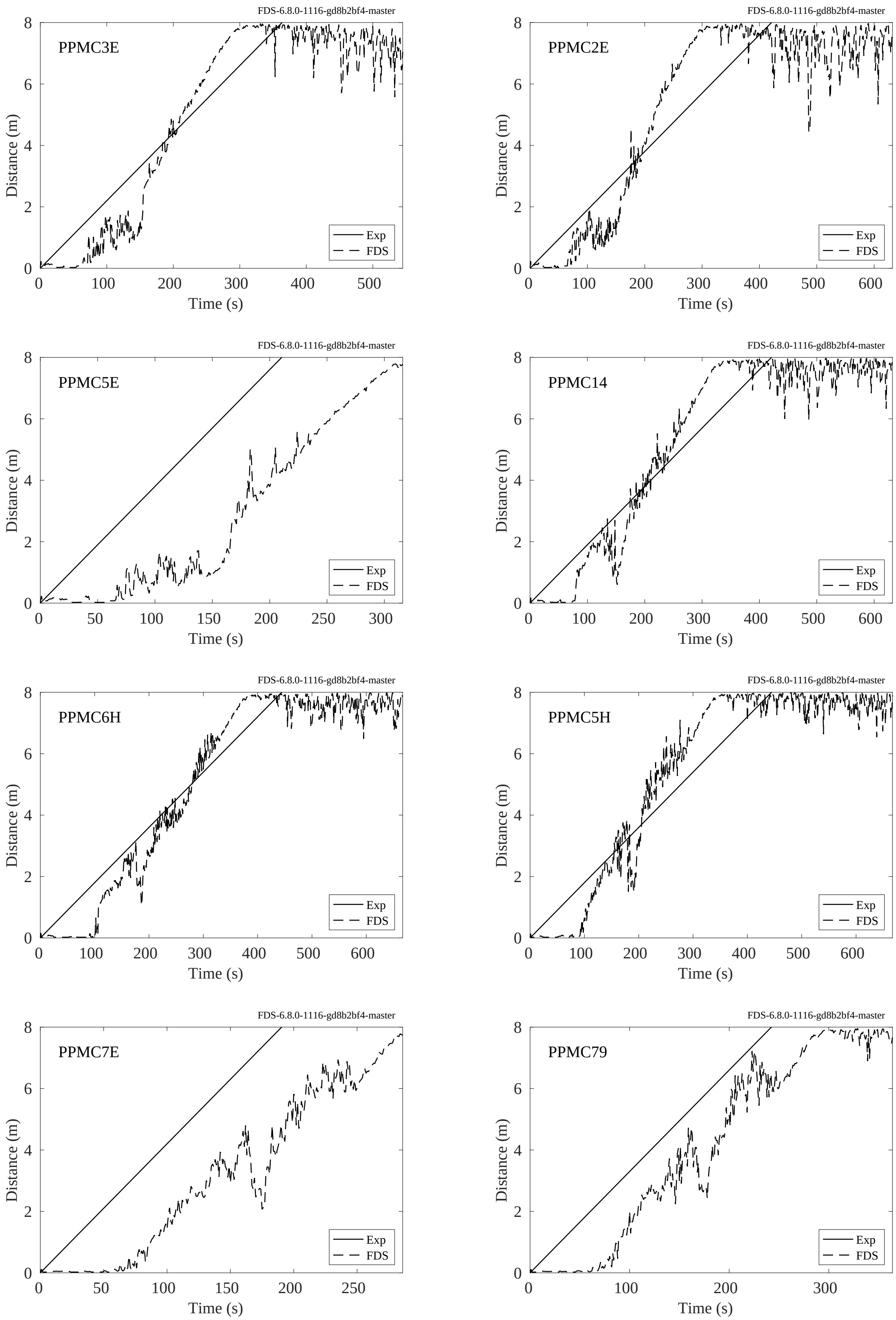


Figure 14.103: Flame front, USFS/Catchpole experiments

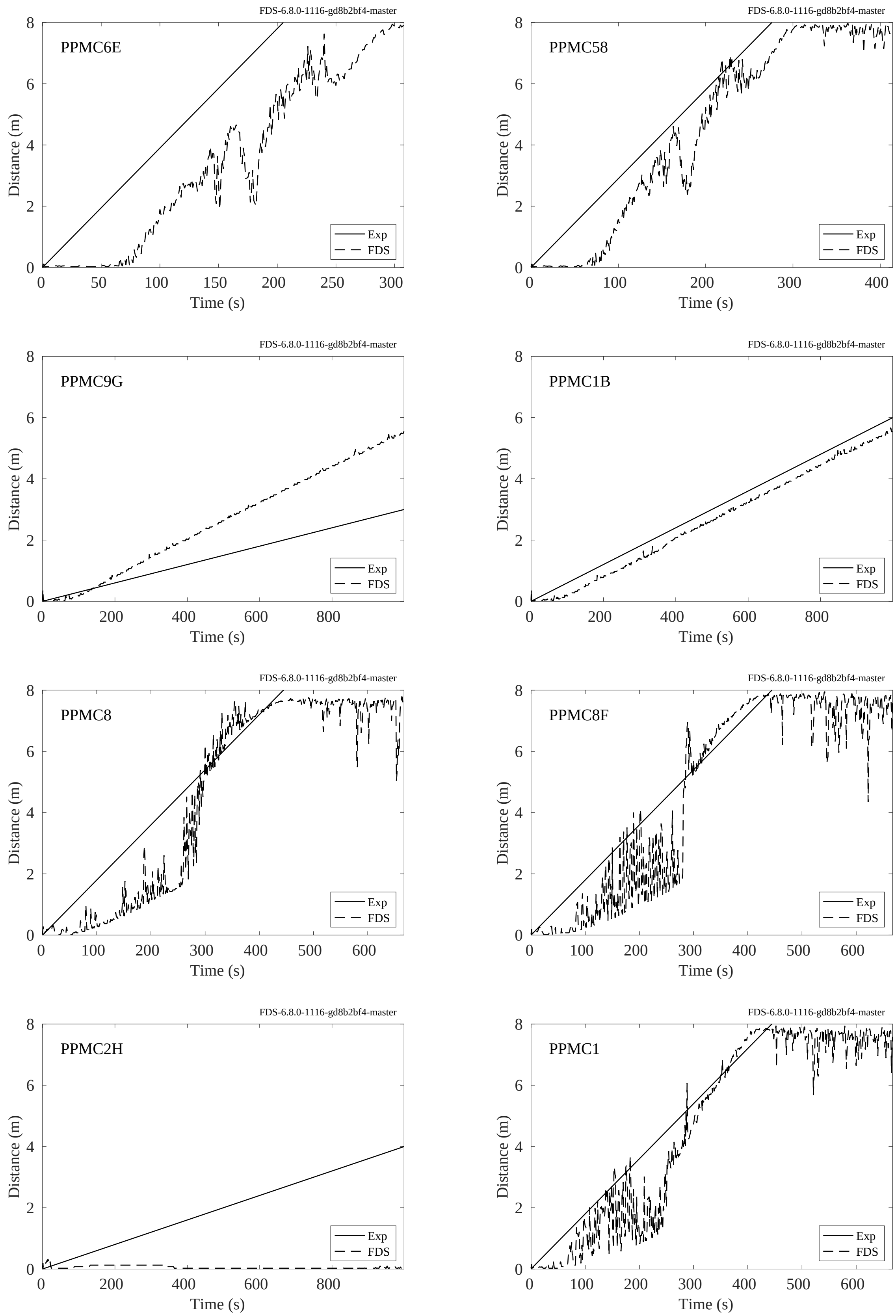


Figure 14.104: Flame front, USFS/Catchpole experiments

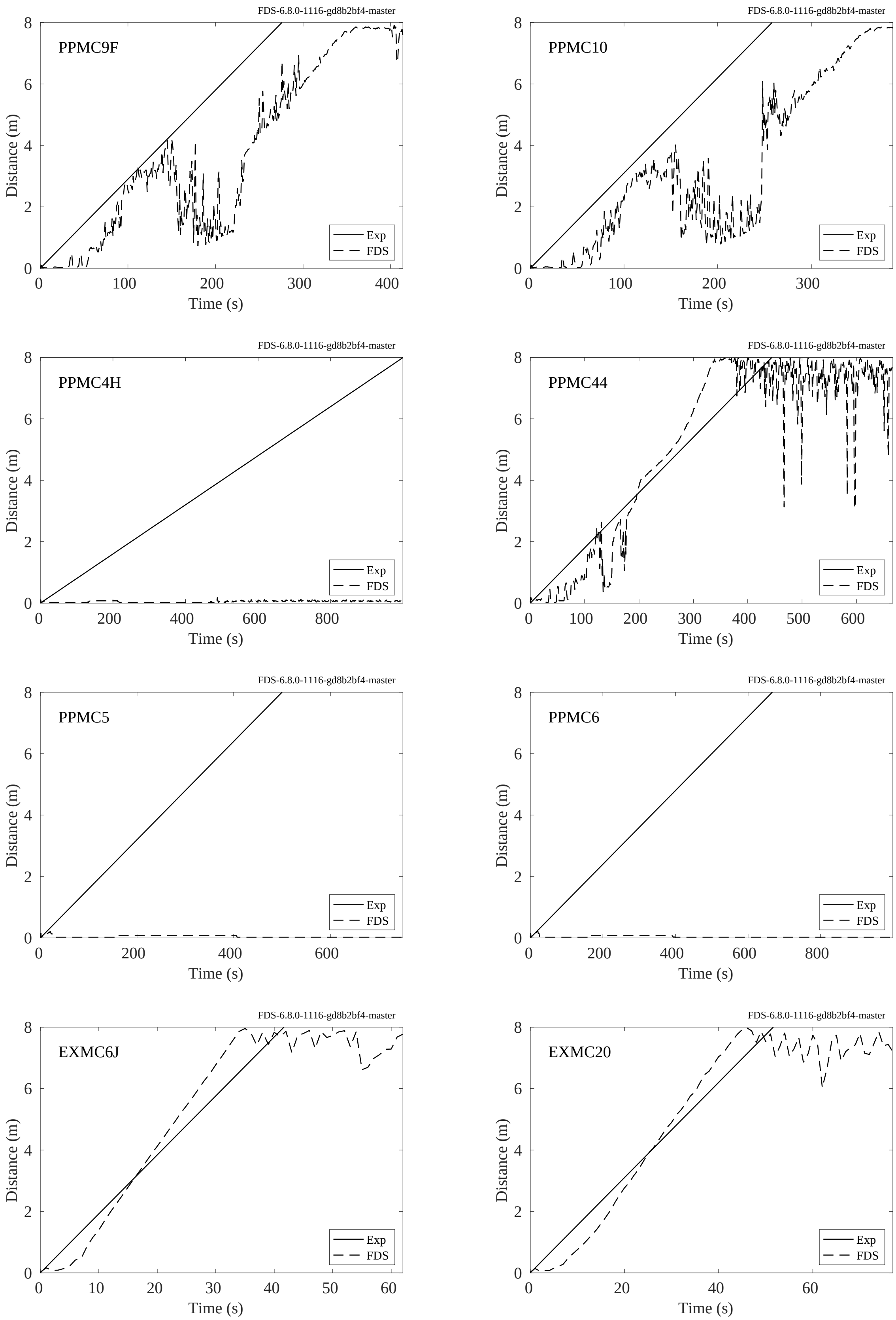


Figure 14.105: Flame front, USFS/Catchpole experiments

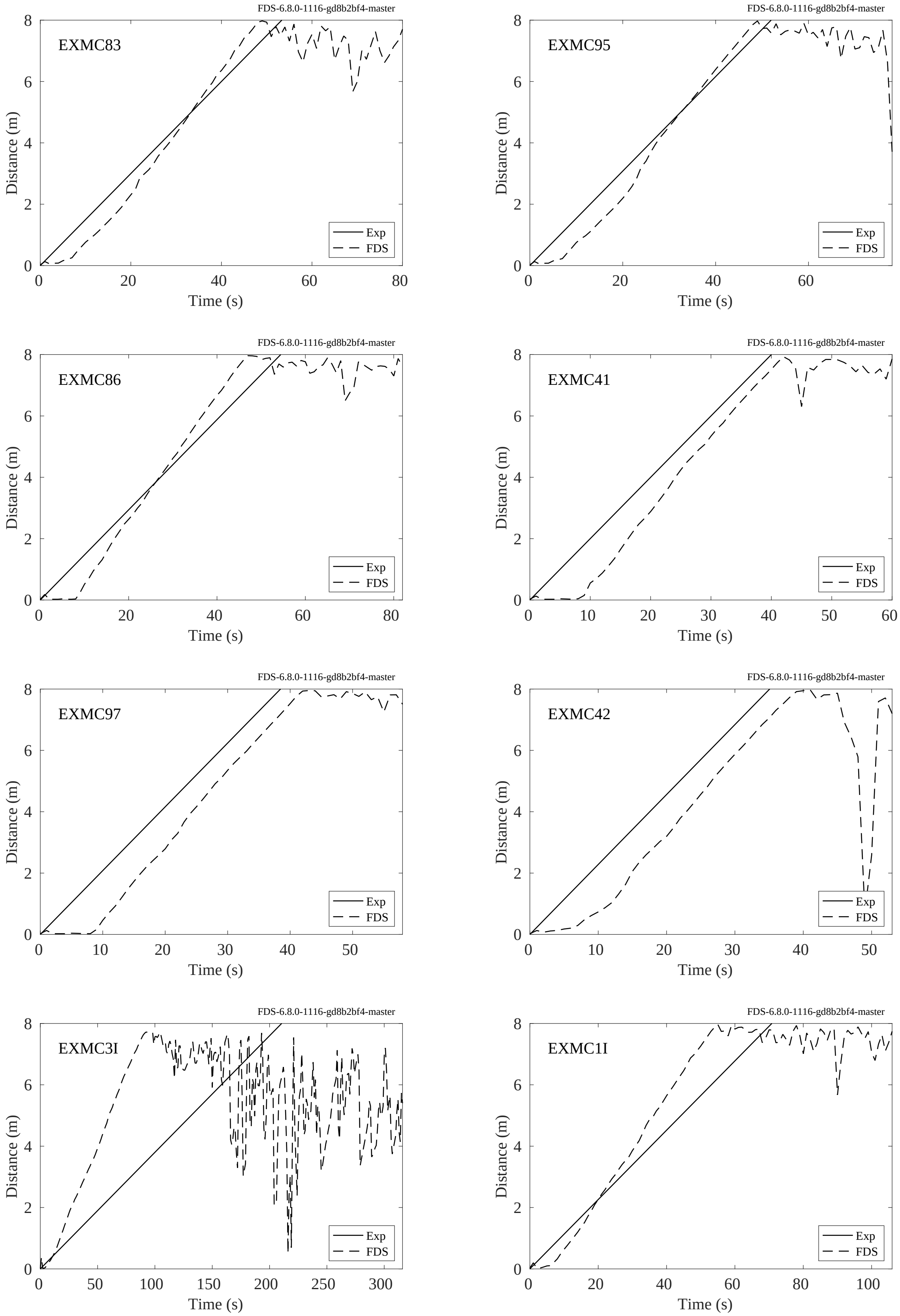


Figure 14.106: Flame front, USFS/Catchpole experiments

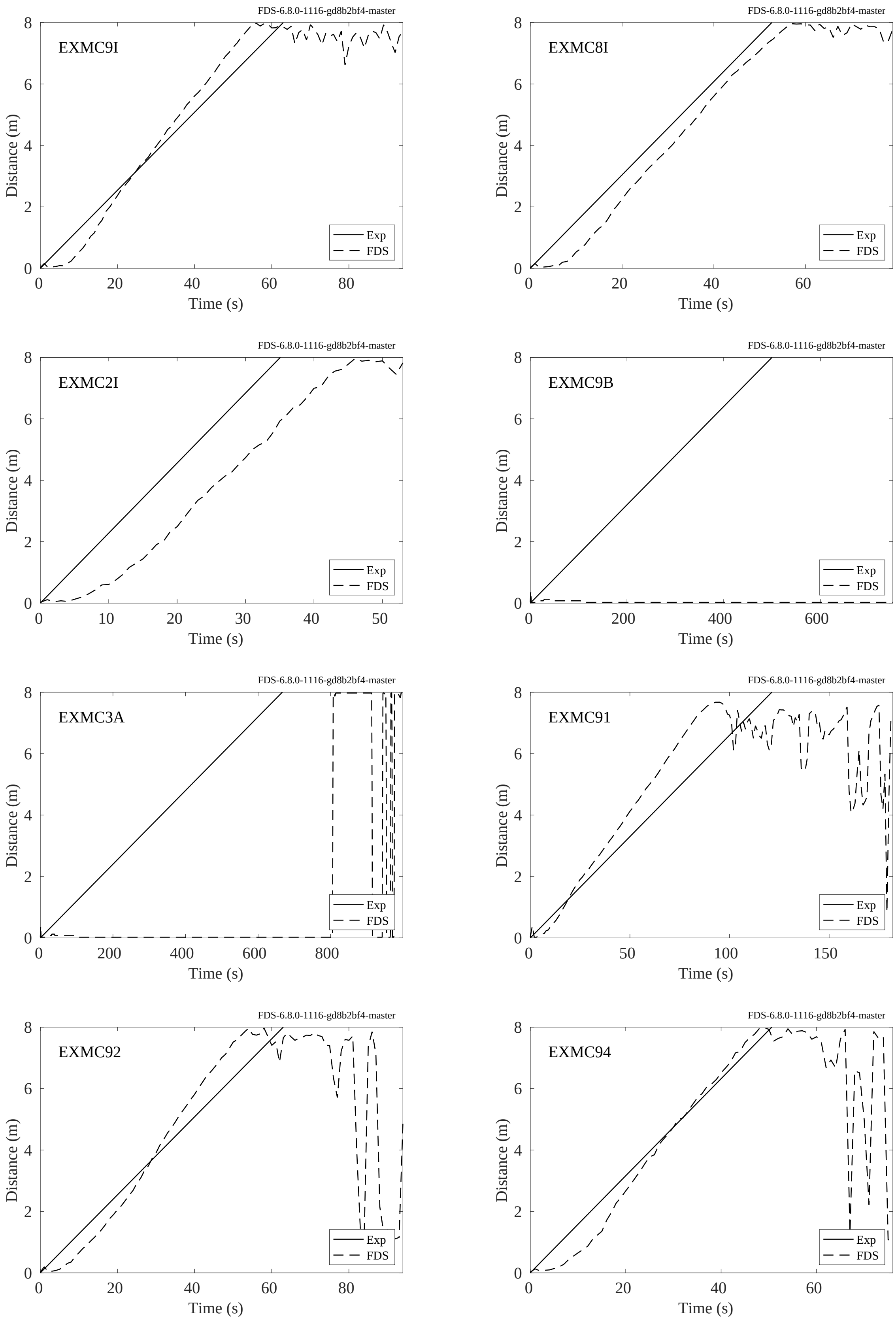


Figure 14.107: Flame front, USFS/Catchpole experiments

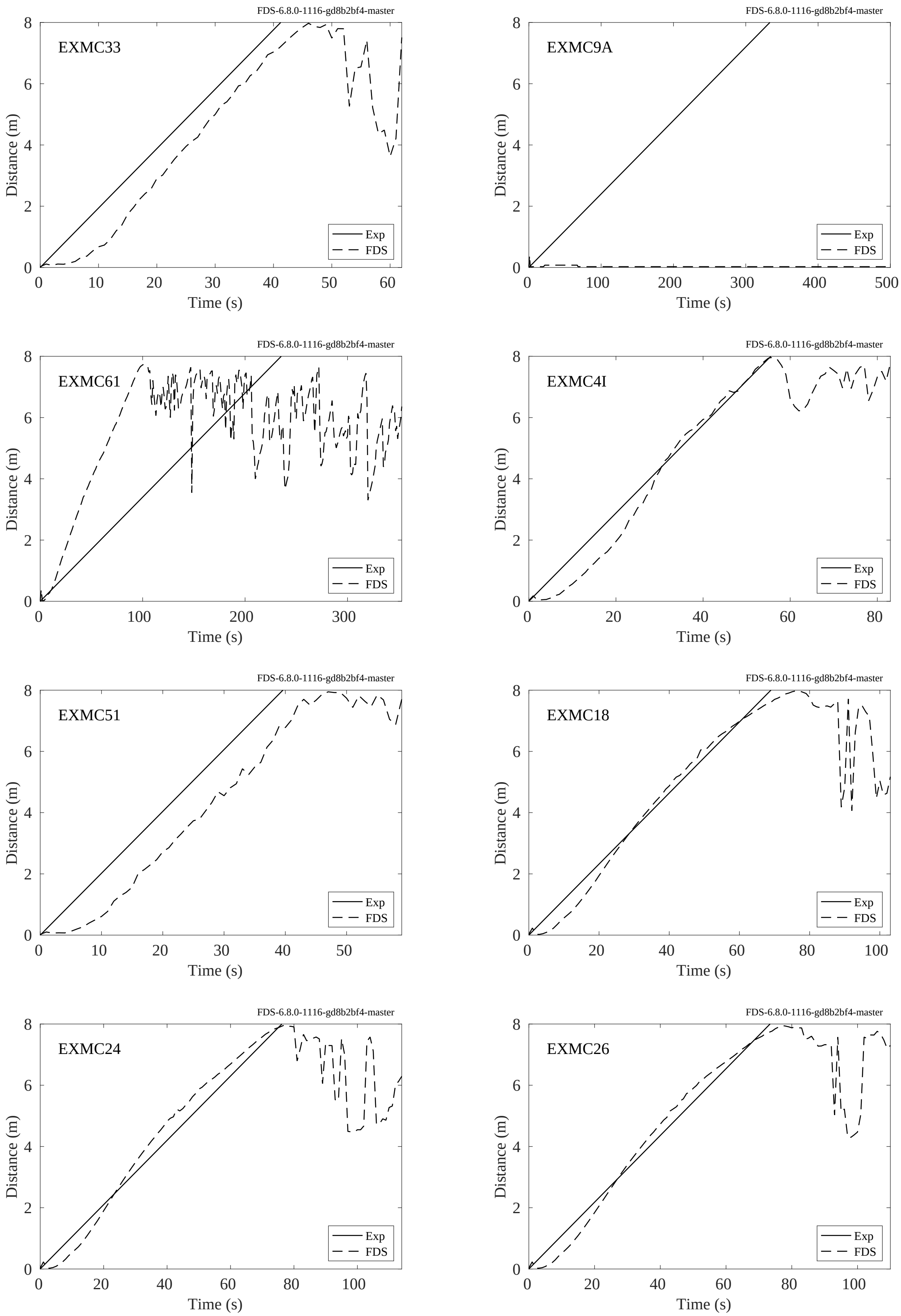


Figure 14.108: Flame front, USFS/Catchpole experiments

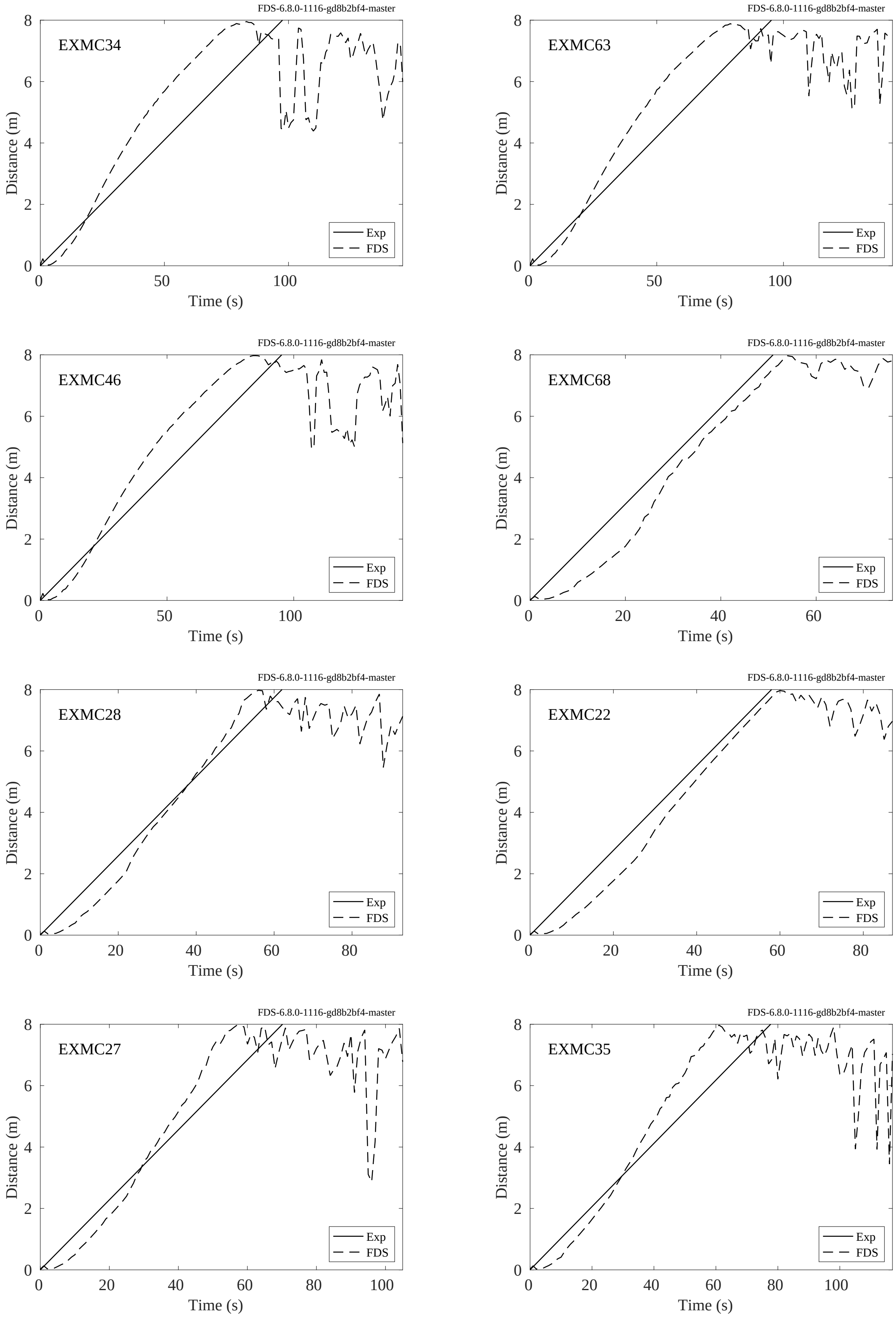


Figure 14.109: Flame front, USFS/Catchpole experiments

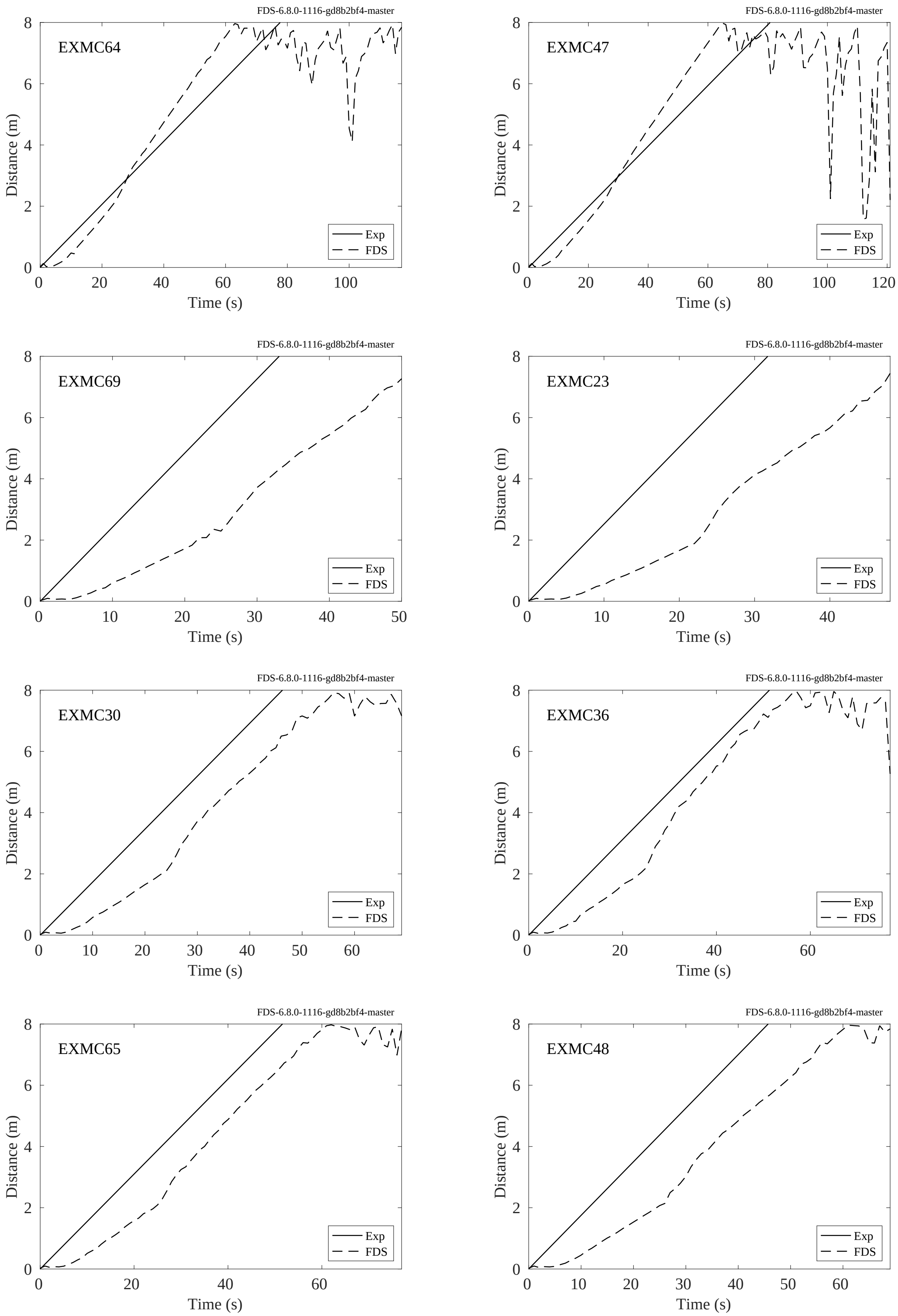


Figure 14.110: Flame front, USFS/Catchpole experiments

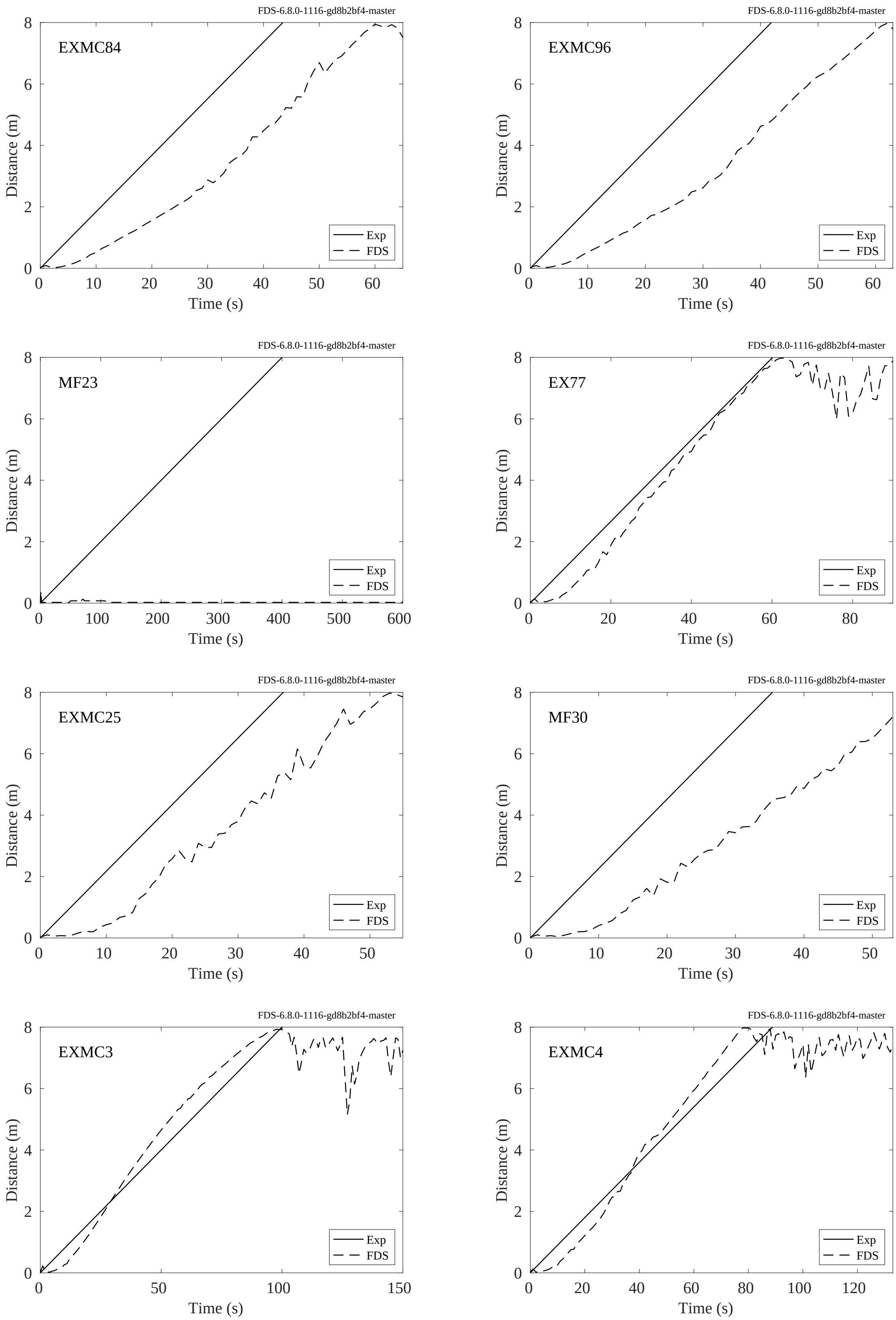


Figure 14.111: Flame front, USFS/Catchpole experiments

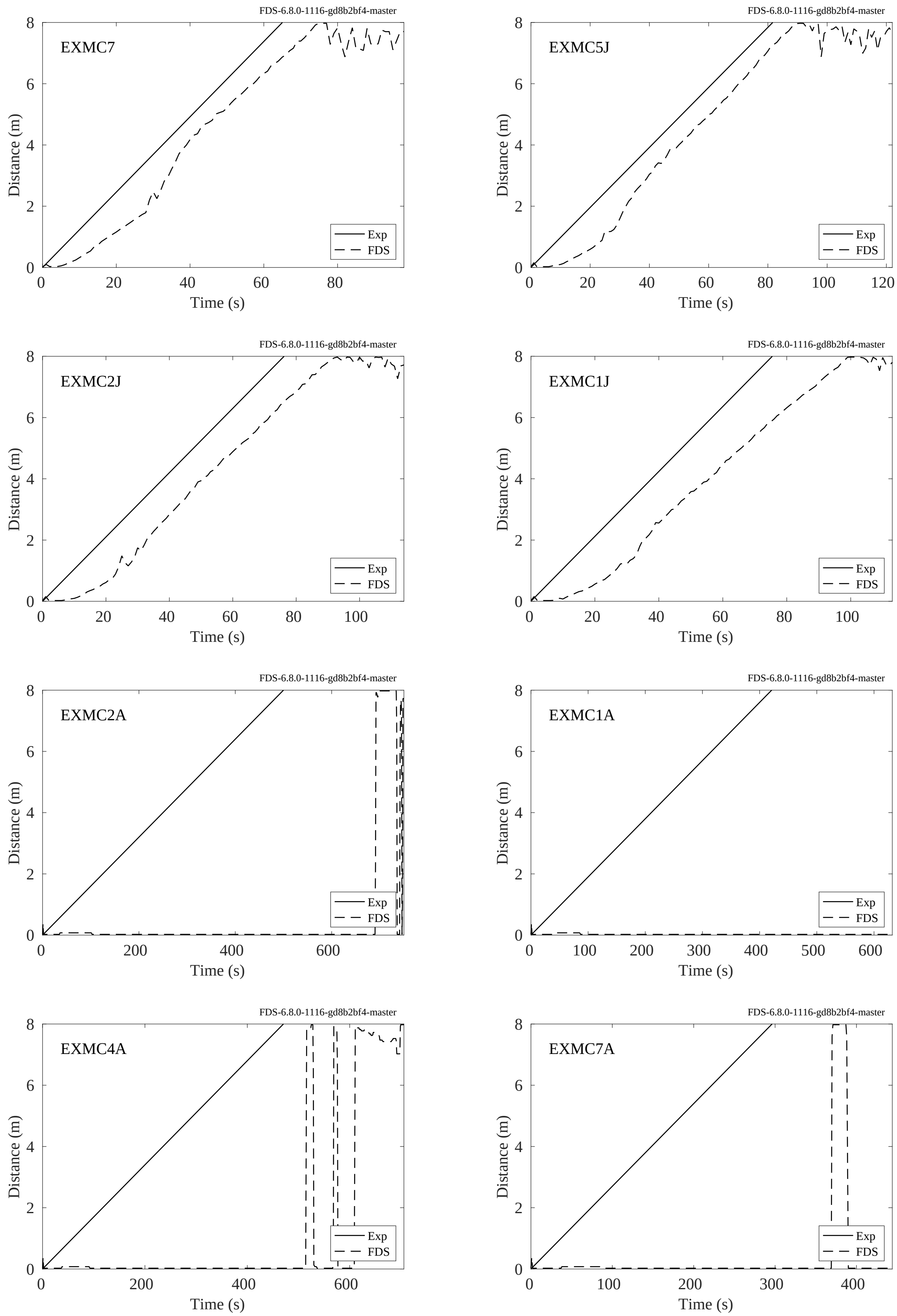


Figure 14.112: Flame front, USFS/Catchpole experiments

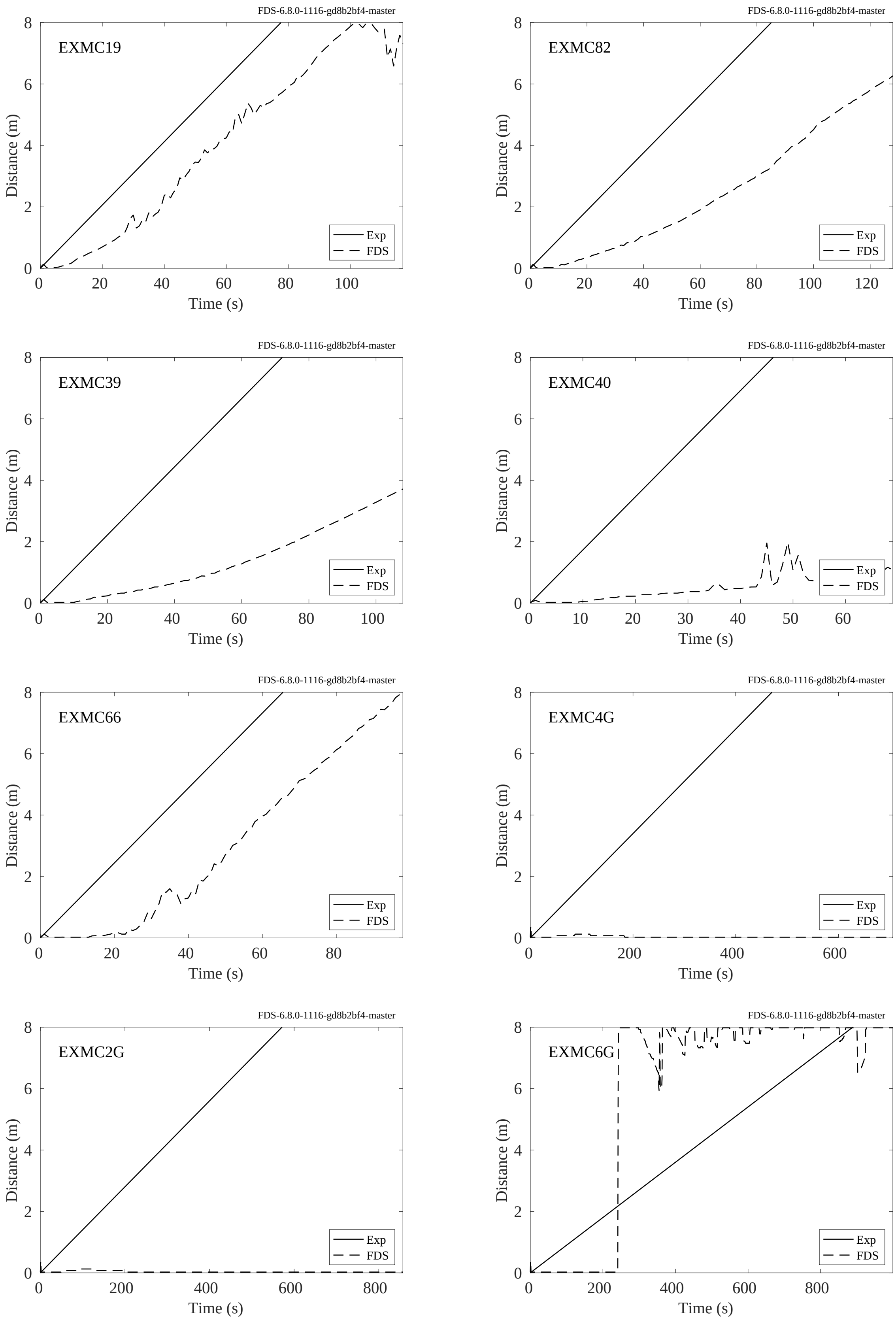


Figure 14.113: Flame front, USFS/Catchpole experiments

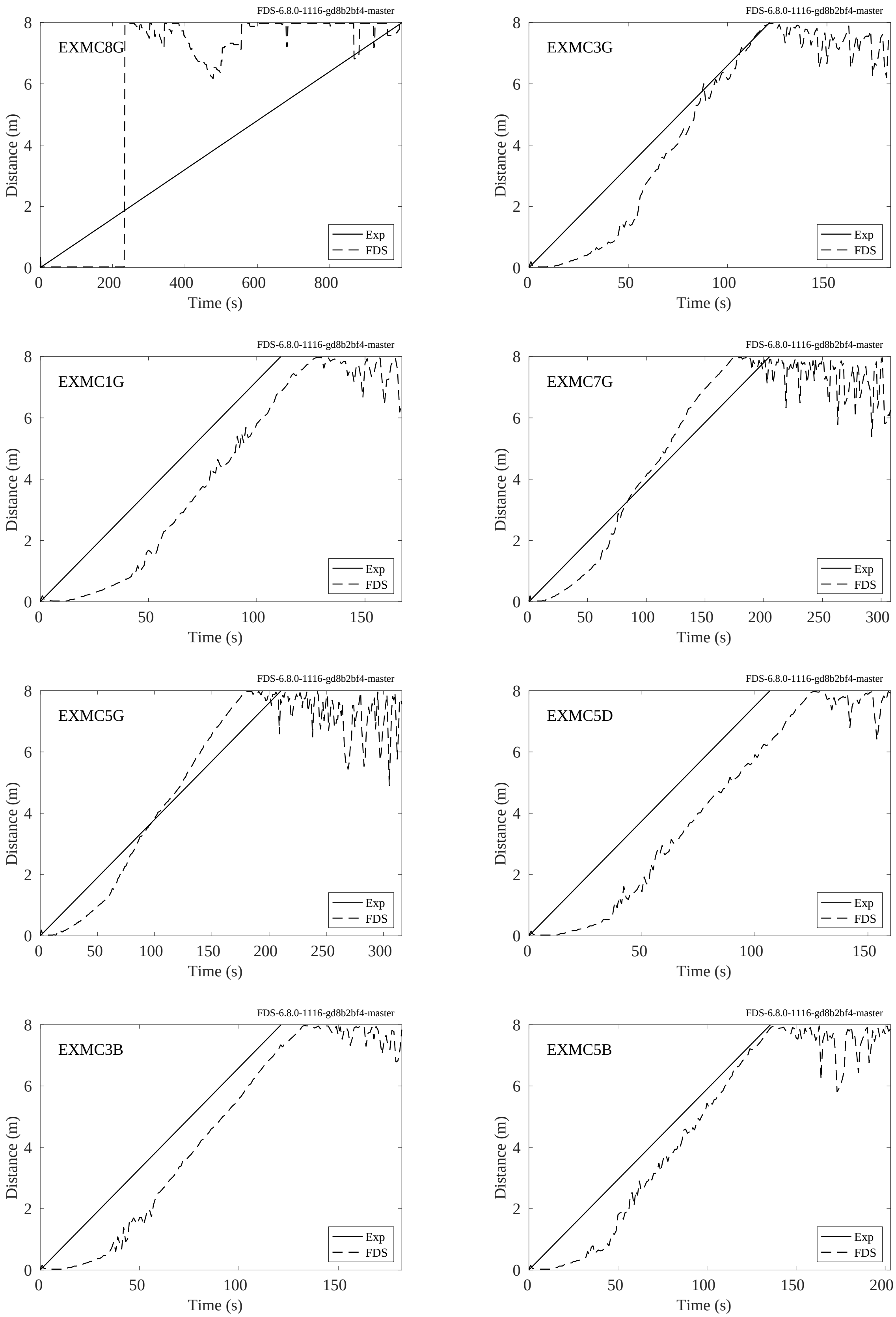


Figure 14.114: Flame front, USFS/Catchpole experiments

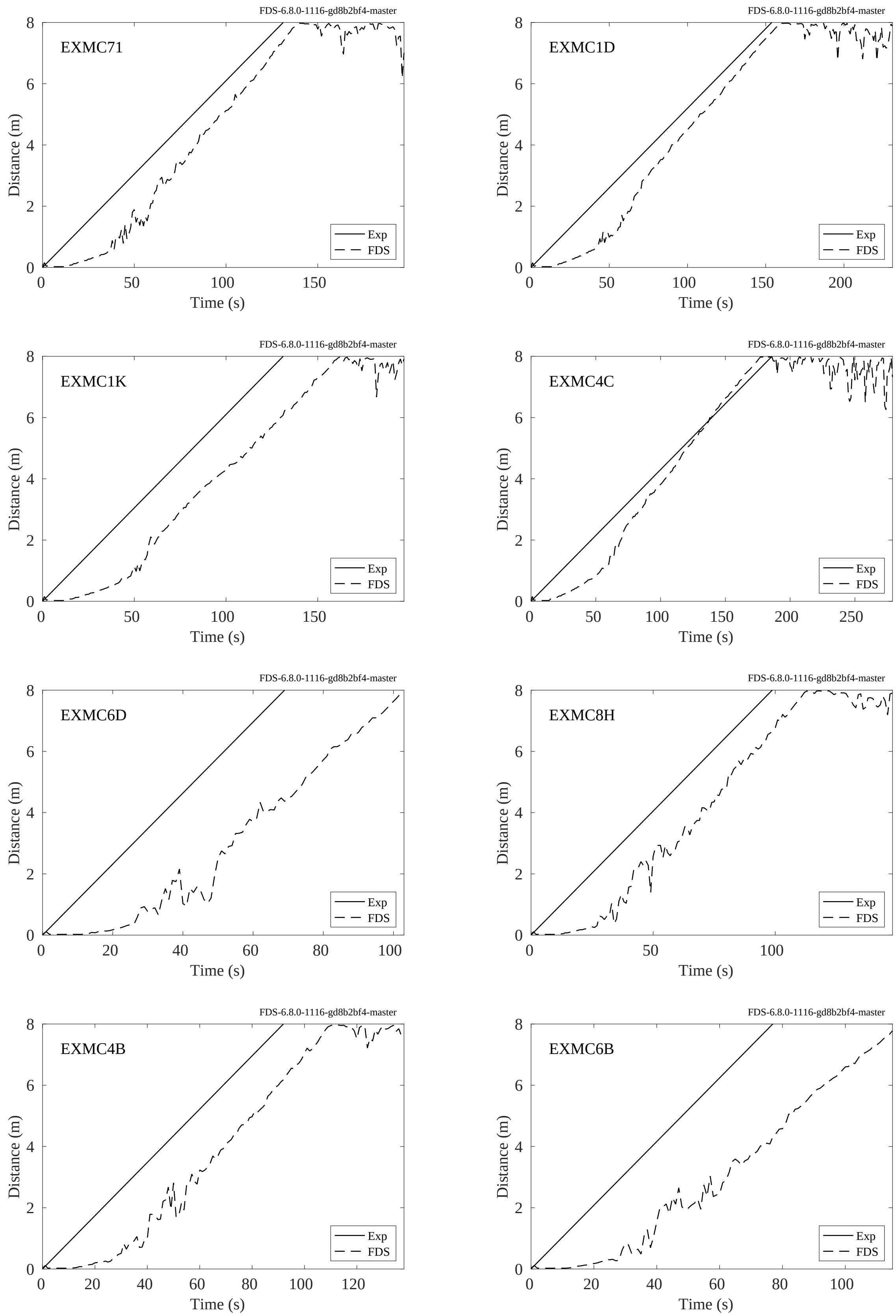


Figure 14.115: Flame front, USFS/Catchpole experiments

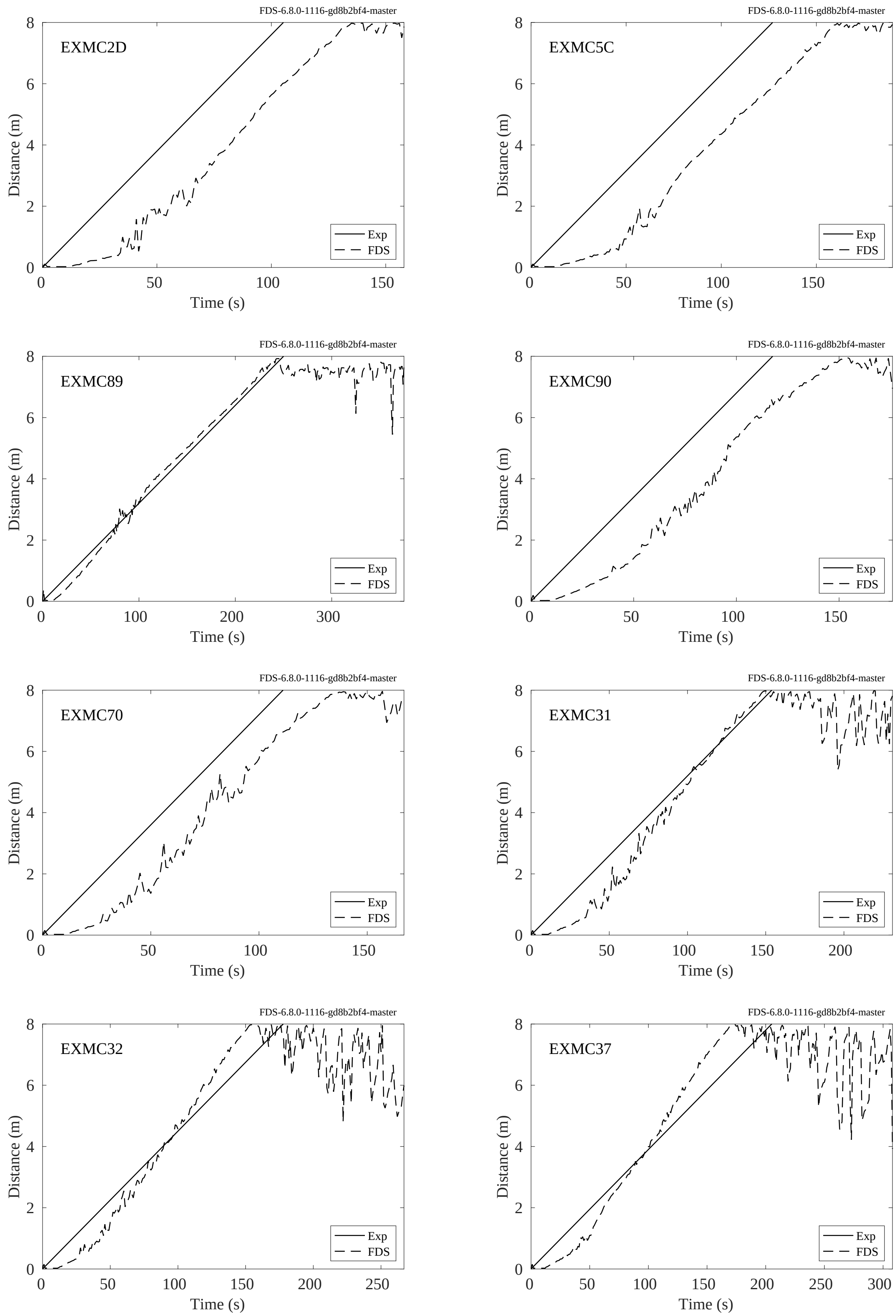


Figure 14.116: Flame front, USFS/Catchpole experiments

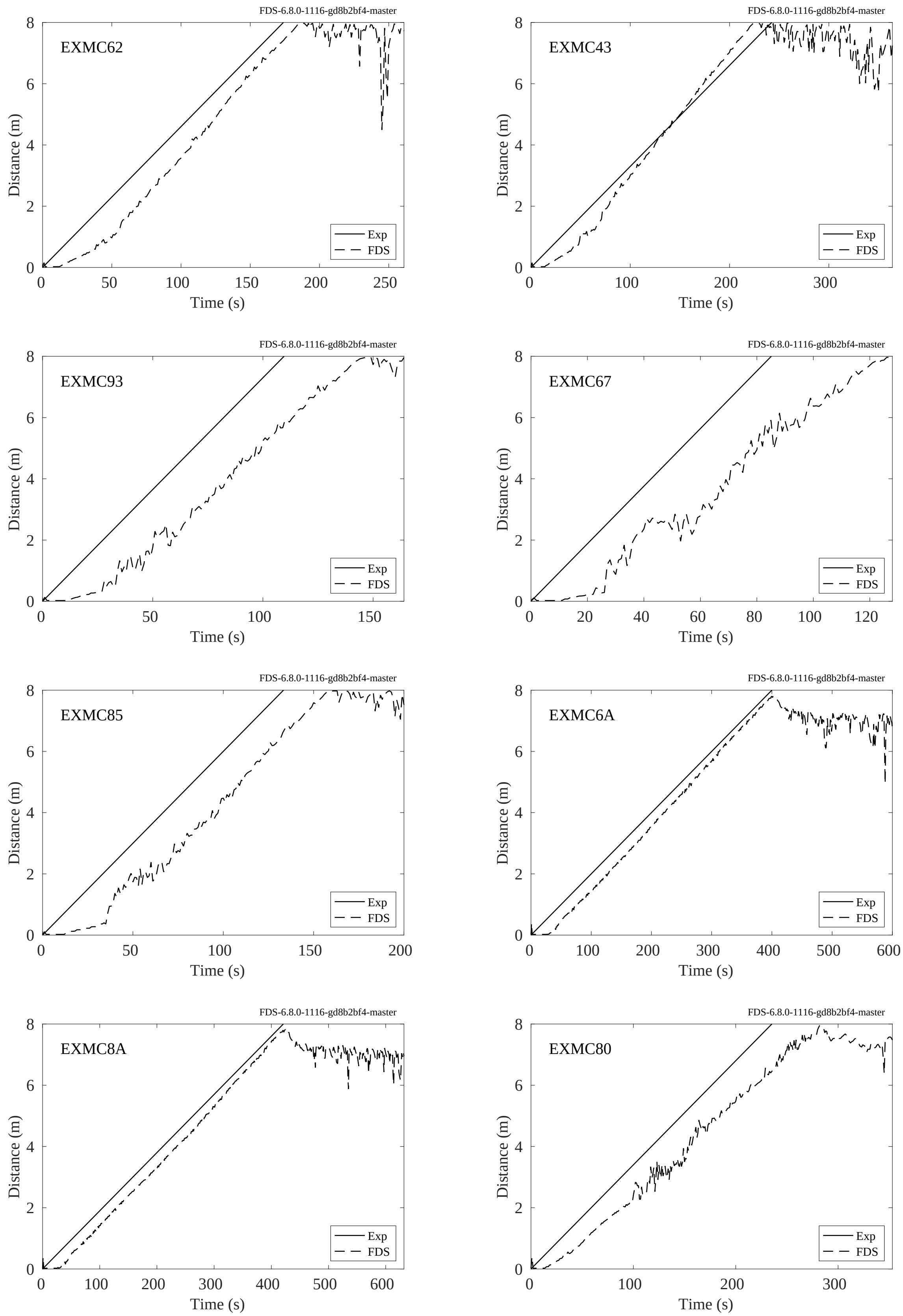


Figure 14.117: Flame front, USFS/Catchpole experiments

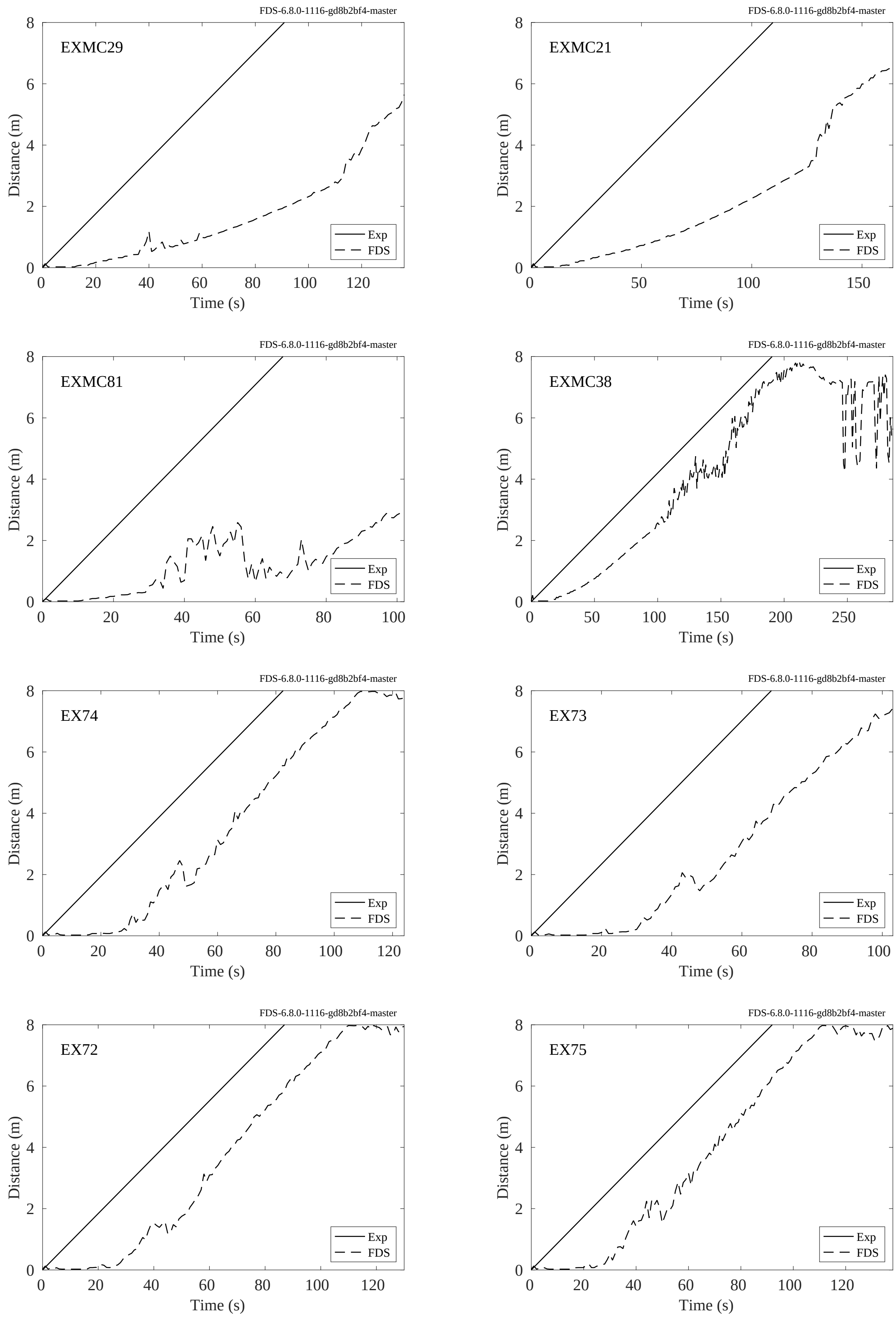


Figure 14.118: Flame front, USFS/Catchpole experiments

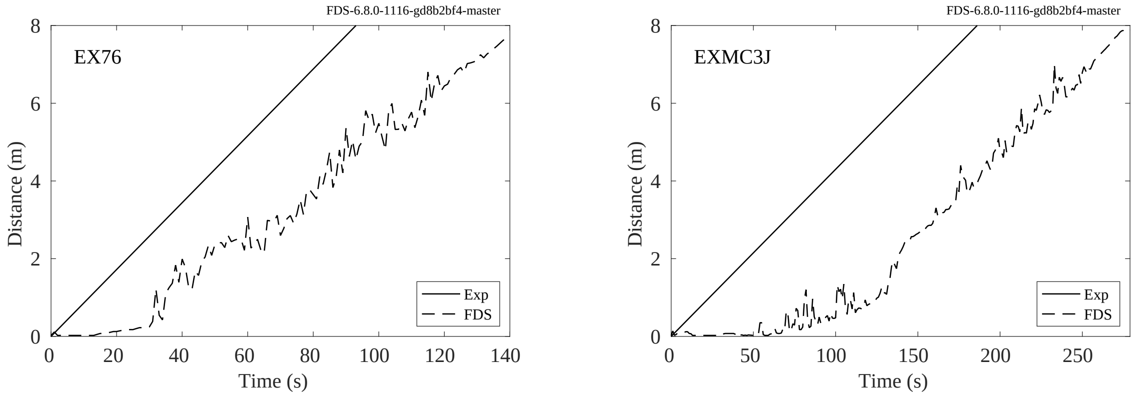


Figure 14.119: Flame front, USFS/Catchpole experiments

14.10.4 USFS/Corsica Fire Spread Experiments

A description of the experiments and modeling strategy can be found in Sec. 3.97. Comparisons of the measured and predicted heat release rates for six bench-scale (1 m by 2 m) fires spreading over pine needles are shown in Fig. 14.120 below. Front trajectory plots are shown in Fig. 14.121.

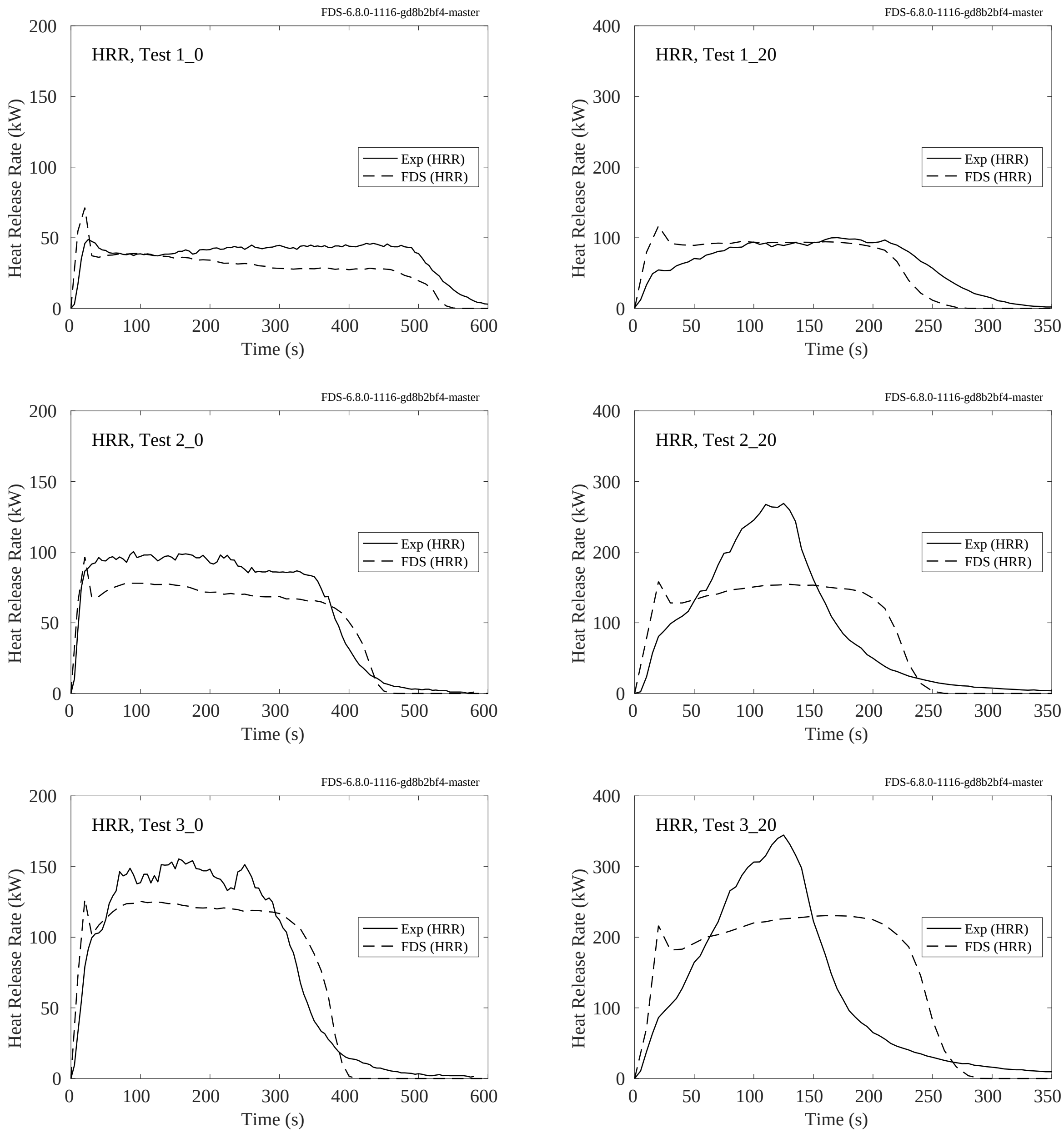


Figure 14.120: HRR, USFS/Corsica experiments.

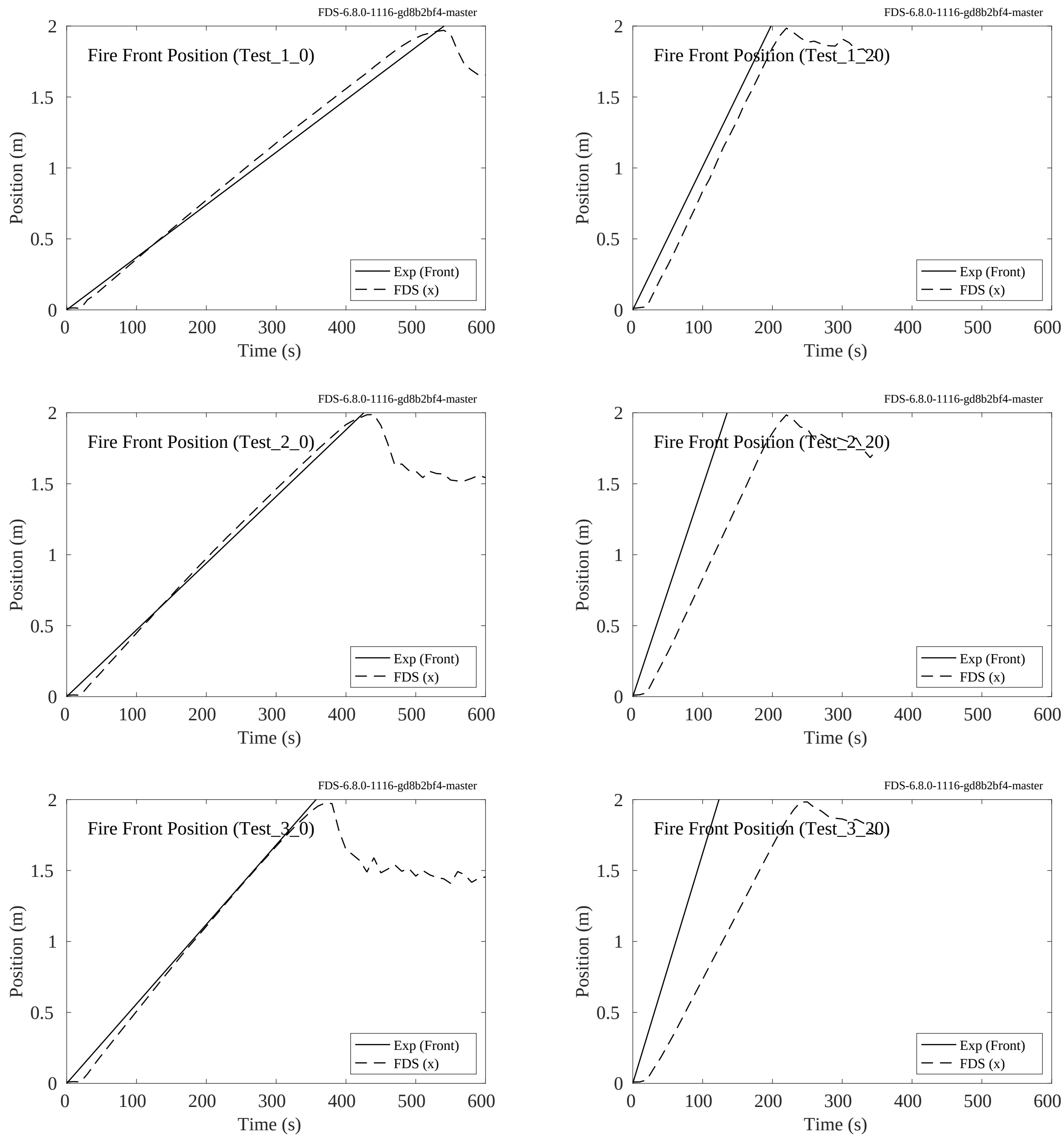


Figure 14.121: Rate of Spread, USFS/Corsica experiments.

14.10.5 Burning Trees (NIST Douglas Firs)

A description of the experiments and modeling assumptions are given in Sec. 3.52.

Snapshots of the simulation of the 2 m tall, 14 % moisture tree are shown in Fig. 14.122. The computational domain in this case is 2 m by 2 m by 4 m. The grid cells are 5 cm cubes. The pine needles are represented by 130,000 Lagrangian particles with a cylindrical geometry, or about 25 simulated needles per grid cell. The radius of the cylinder is derived from the measured surface area to volume ratio. Each simulated pine needle or segment of roundwood represents many more actual needles or segments. The weighting factor is determined from the estimated bulk mass per unit volume. The results of the simulations are shown in Fig. 14.123.

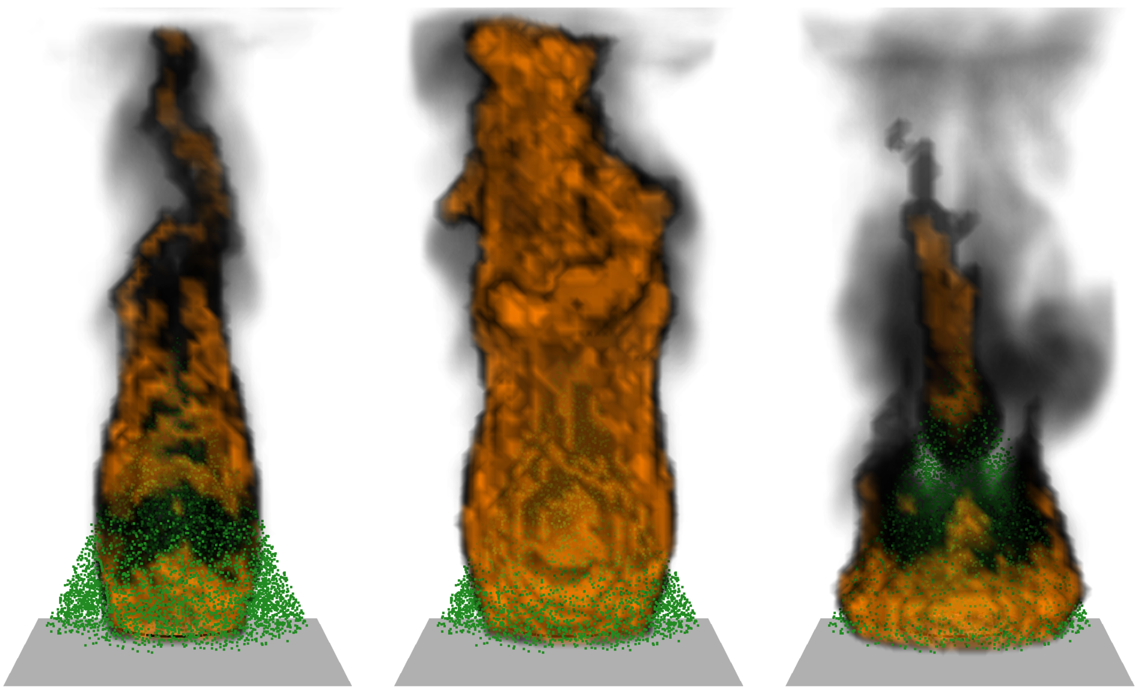


Figure 14.122: Snapshots of the simulation of the 2 m tall Douglas fir tree, 14 % moisture.

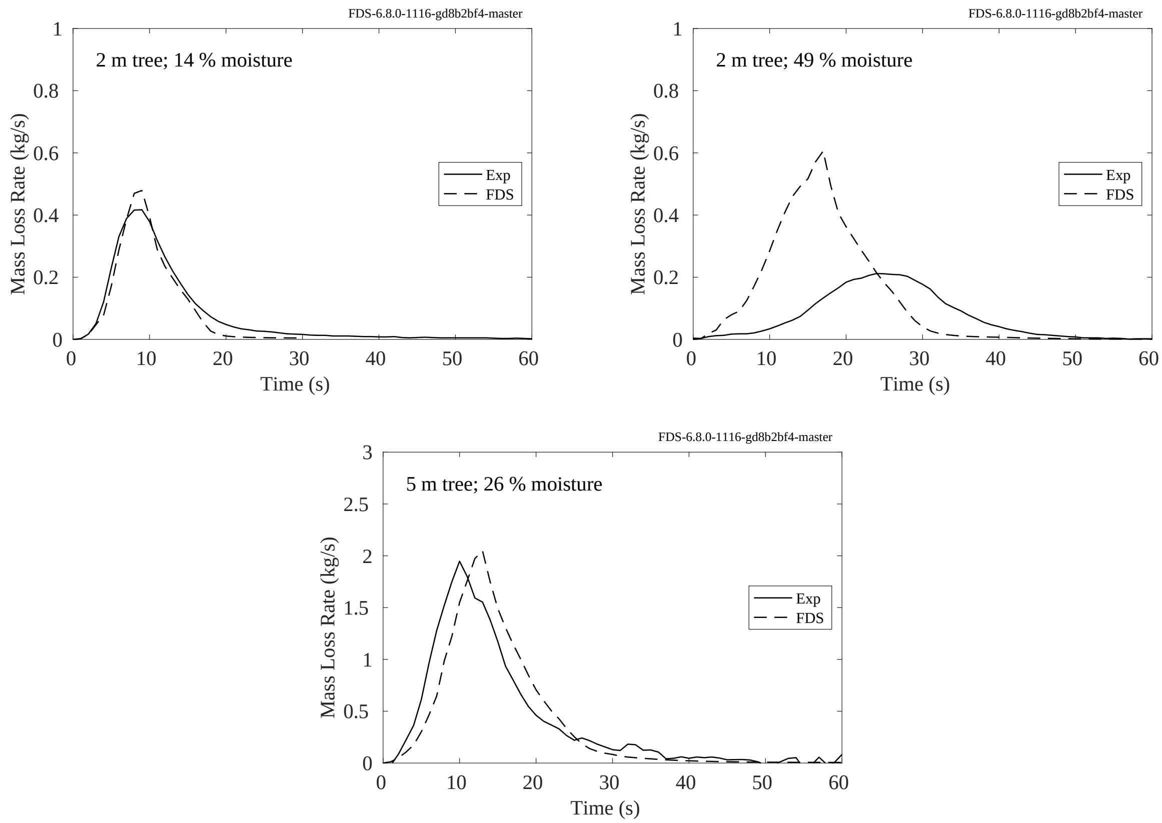


Figure 14.123: Comparison measured and predicted mass loss rate for the Douglas fir tree experiments.

14.11 Summary of Burning and Spread Rates

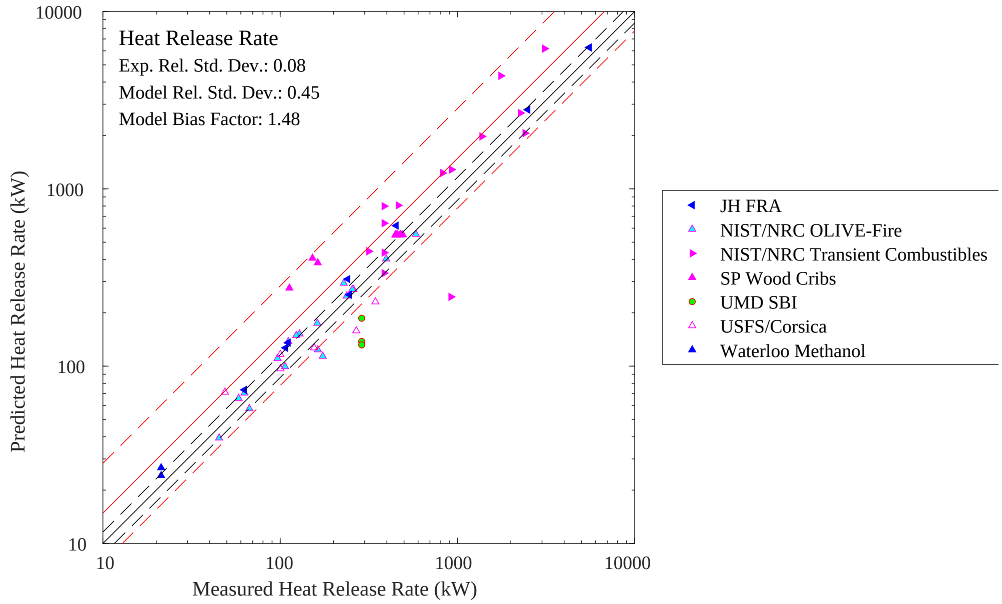


Figure 14.124: Summary of heat release rate predictions.

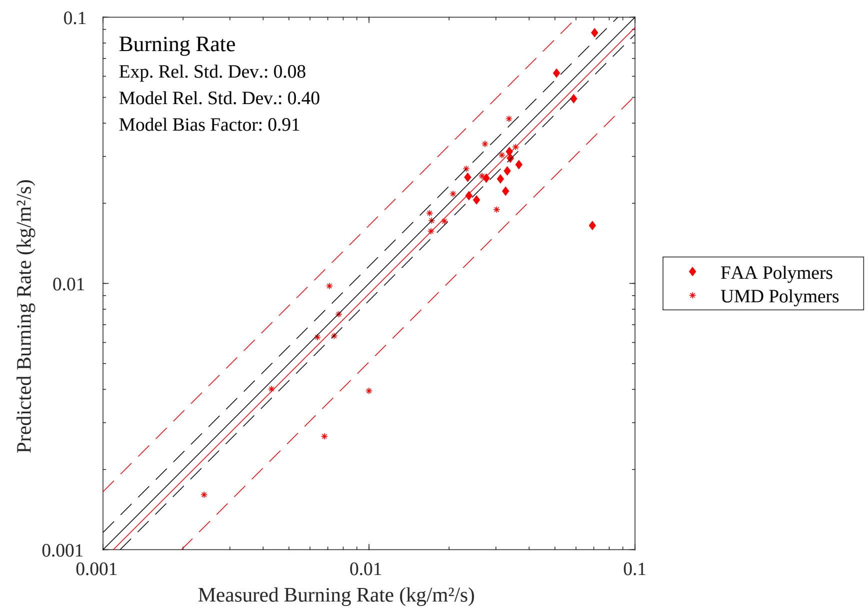


Figure 14.125: Summary of burning rate predictions.

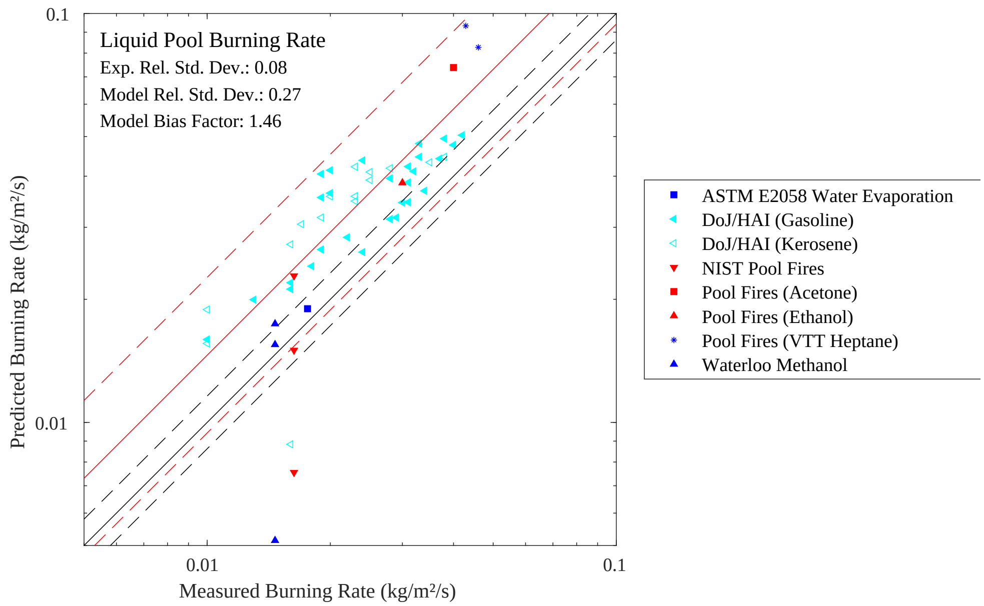


Figure 14.126: Summary of liquid pool burning rate predictions.

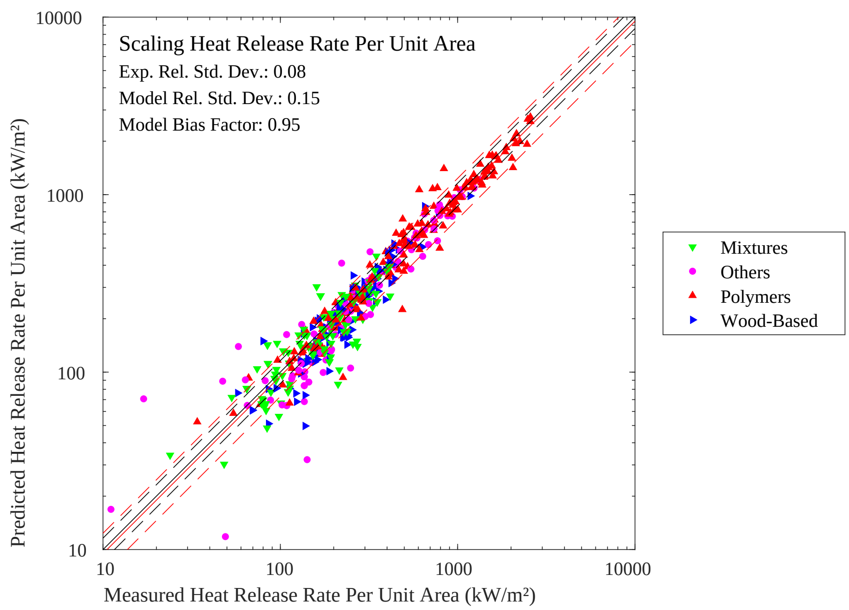


Figure 14.127: Summary of scaling heat release rate per unit area predictions.

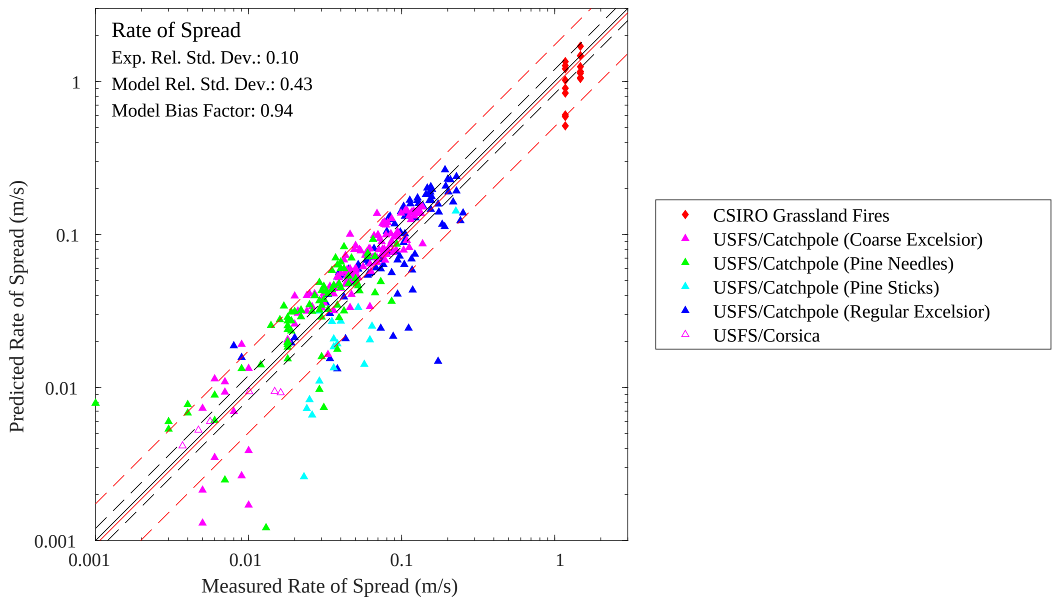


Figure 14.128: Summary, Wildfire Rate of Spread.

Chapter 15

Wind Engineering and Atmospheric Dispersion

This chapter presents results of simulations of wind over structures and atmospheric dispersion, all involving a simplified atmospheric boundary layer model in FDS.

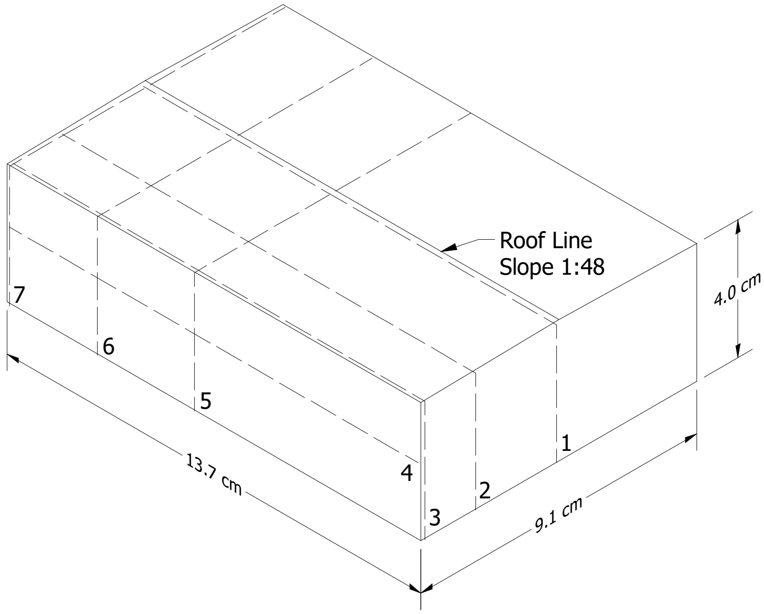
15.1 UWO Wind Tunnel Experiments

A description of the UWO Wind Tunnel experiments is included in Sec. 3.99. Schematic drawings of the wind tunnel models are shown in Fig. 15.1.

Figures 15.2 through 15.5 show comparisons of measured and predicted mean, rms, minimum and maximum values of the pressure coefficients on the surface of a 1:100 scale model of a building in a wind tunnel. The model building is shown at the top of Fig. 15.1. Figures 15.6 through 15.9 show similar results for the model shown at the bottom of Fig. 15.1. The comparisons are made for two wind directions for each model. For SS20-Test 7, the 180° wind direction is perpendicular to the model's shorter side. The 270° wind direction is perpendicular to the model's longer side. For the SS21-Test 6 model, the wind directions are 0° (perpendicular to short side) and 45°.

The diagrams in Fig. 15.1 indicate the location of the "lines" where the data is compared. The discontinuities in the lines represent the transition from the windward side, to the roof, to the leeward side. The side plots do not include windward or leeward side data.

The simulations are run for approximately one-tenth the time as that of the experiments, which were run for 100 s. The minimum and maximum values for the simulations are extrapolated so that they may be compared to the measured min and max for the 100 s experiment. The procedure is described in the FDS User's Guide [1], in the section describing the `TEMPORAL_STATISTIC` `'MIN'` and `'MAX'`.



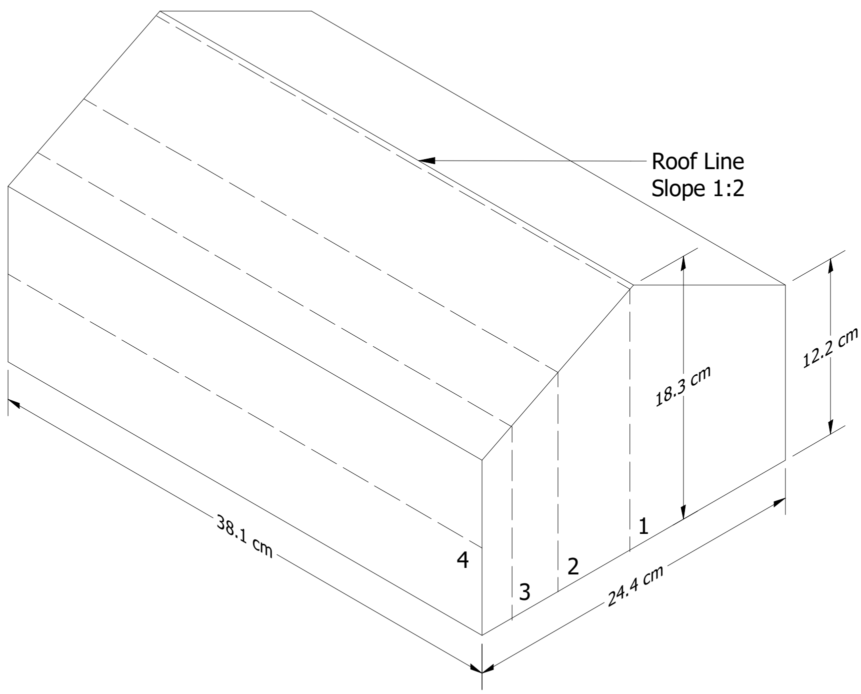


Figure 15.1: UWO Wind Tunnel schematic drawings. (Top) SS20-Test 7. (Bottom) SS21-Test 6. The numbers at the base of the models denote the starting points of the lines over which the measurements and predictions are compared.

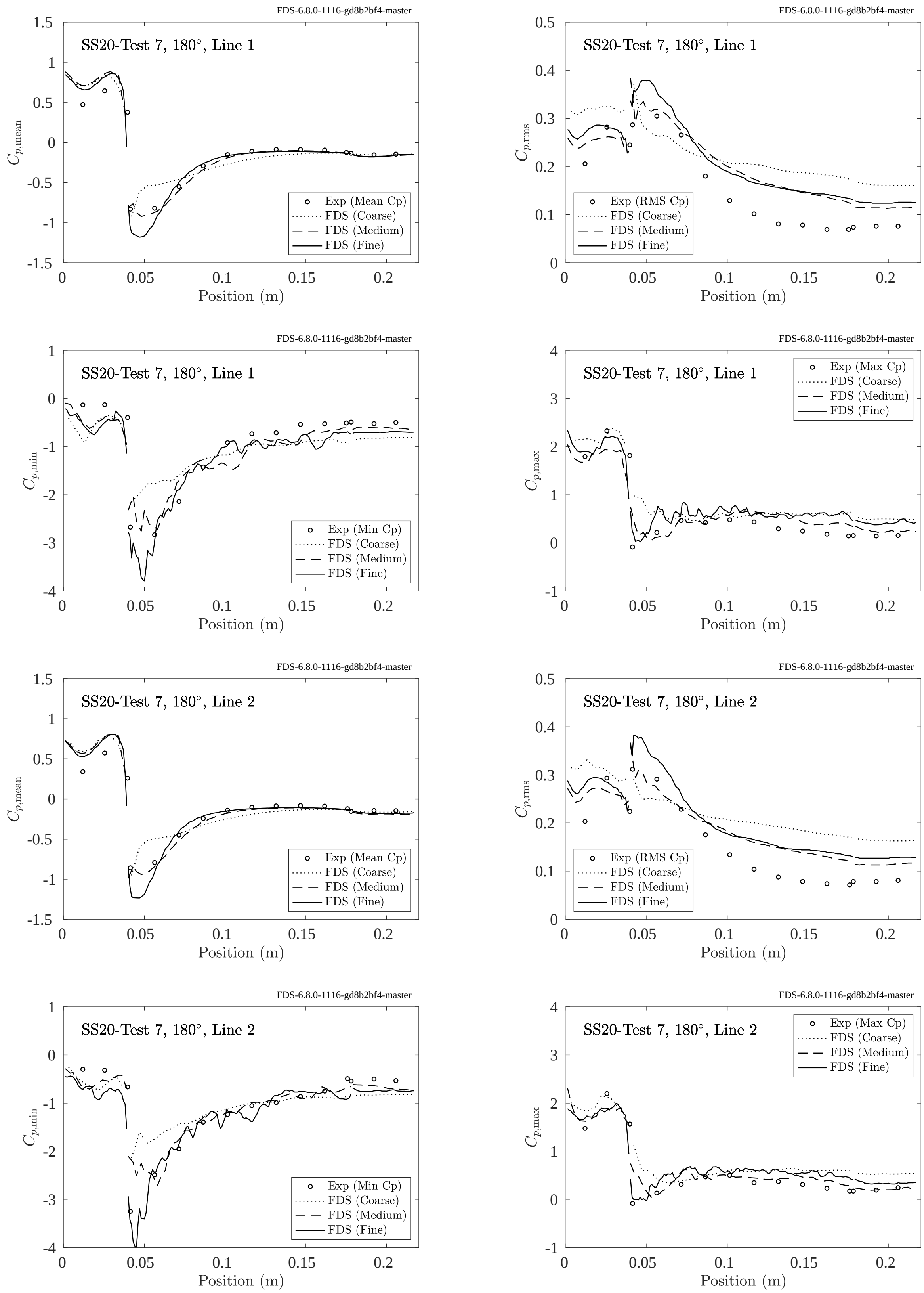


Figure 15.2: UWO Wind Tunnel, SS20-Test 7 pressure coefficients, 180° wind direction.

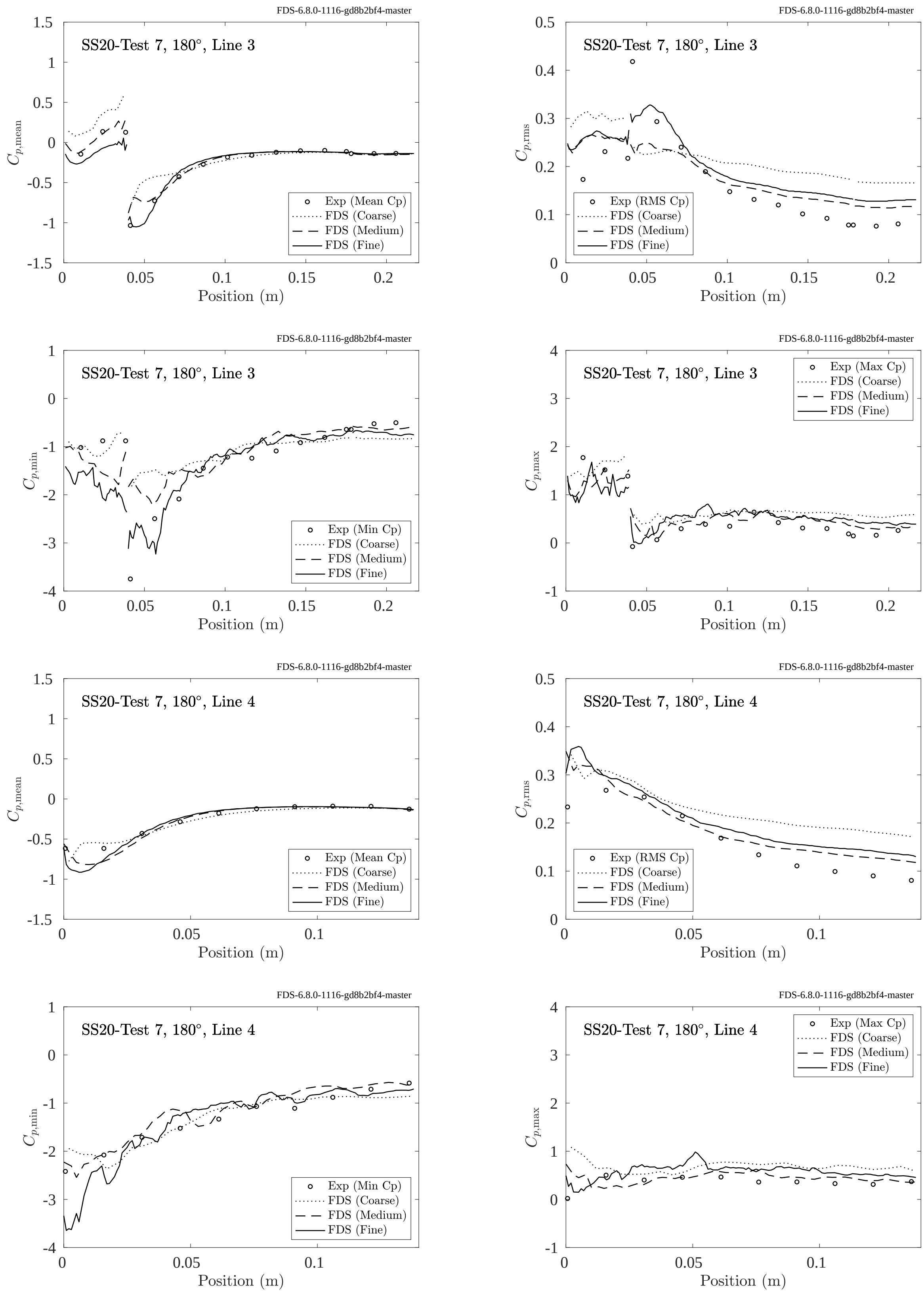


Figure 15.3: UWO Wind Tunnel, SS20-Test 7 pressure coefficients, 180° wind direction.

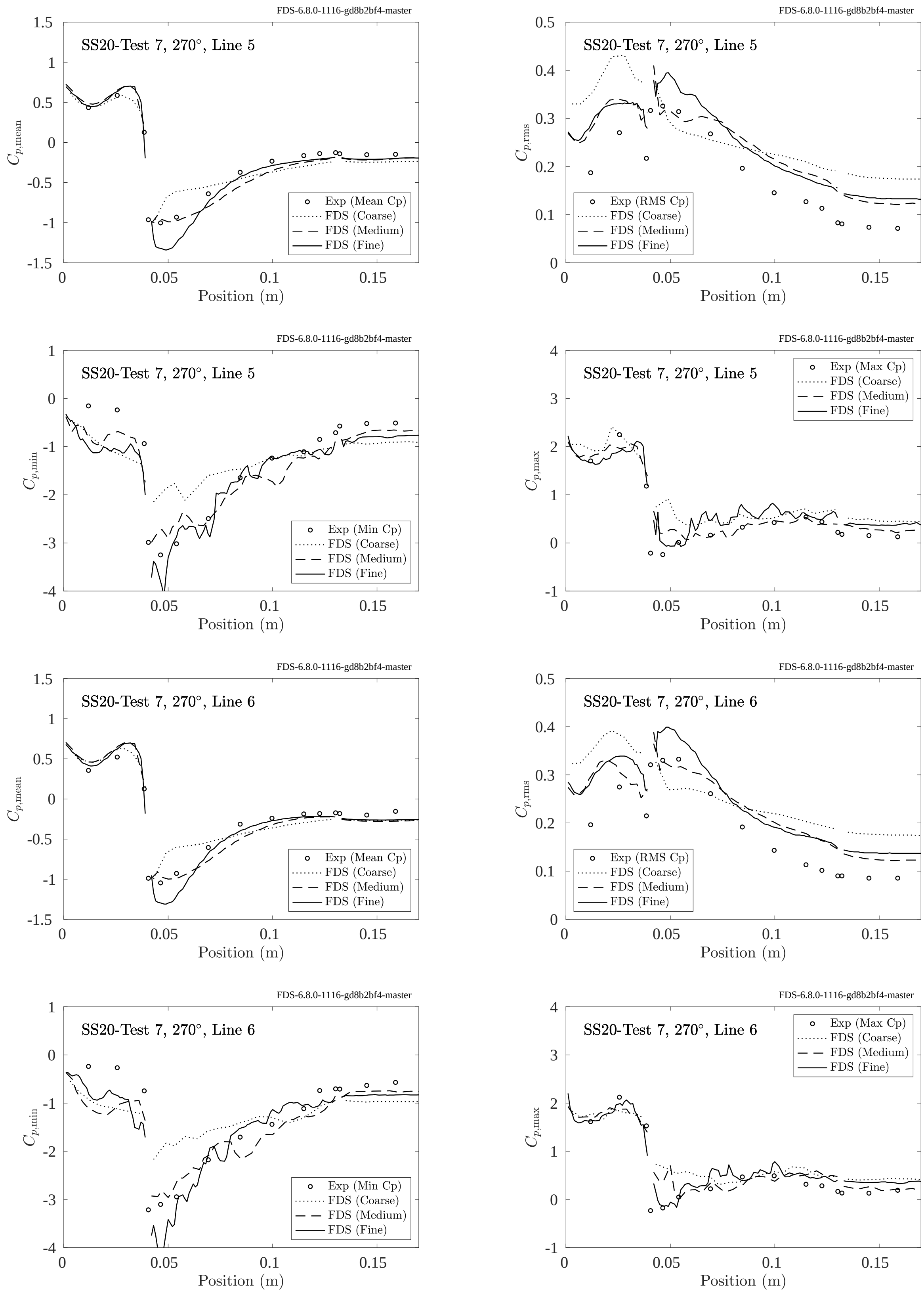


Figure 15.4: UWO Wind Tunnel, SS20-Test 7 pressure coefficients, 270° wind direction.

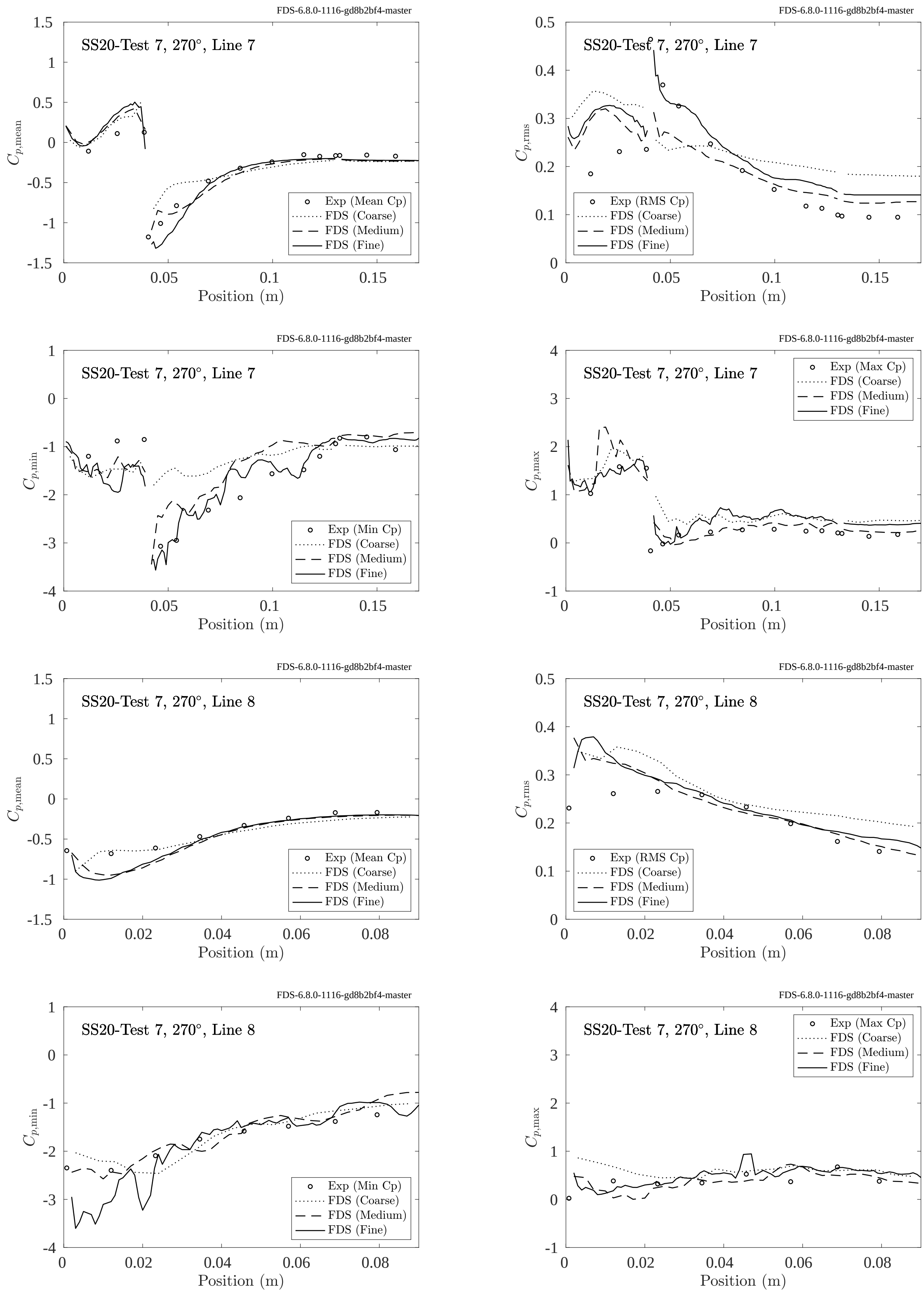


Figure 15.5: UWO Wind Tunnel, SS20-Test 7 pressure coefficients, 270° wind direction.

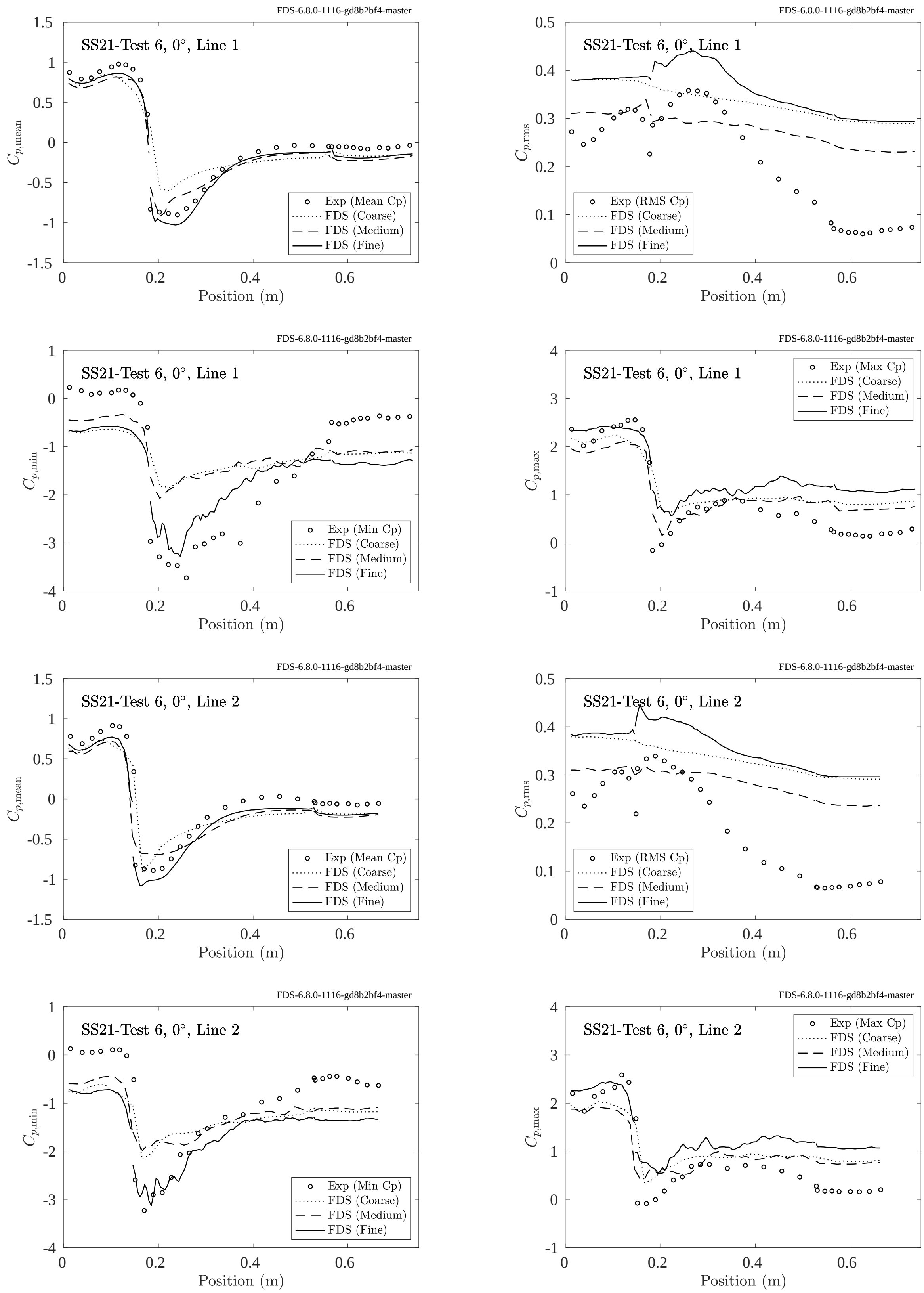


Figure 15.6: UWO Wind Tunnel, SS21-Test 6 pressure coefficients, 0° wind direction.

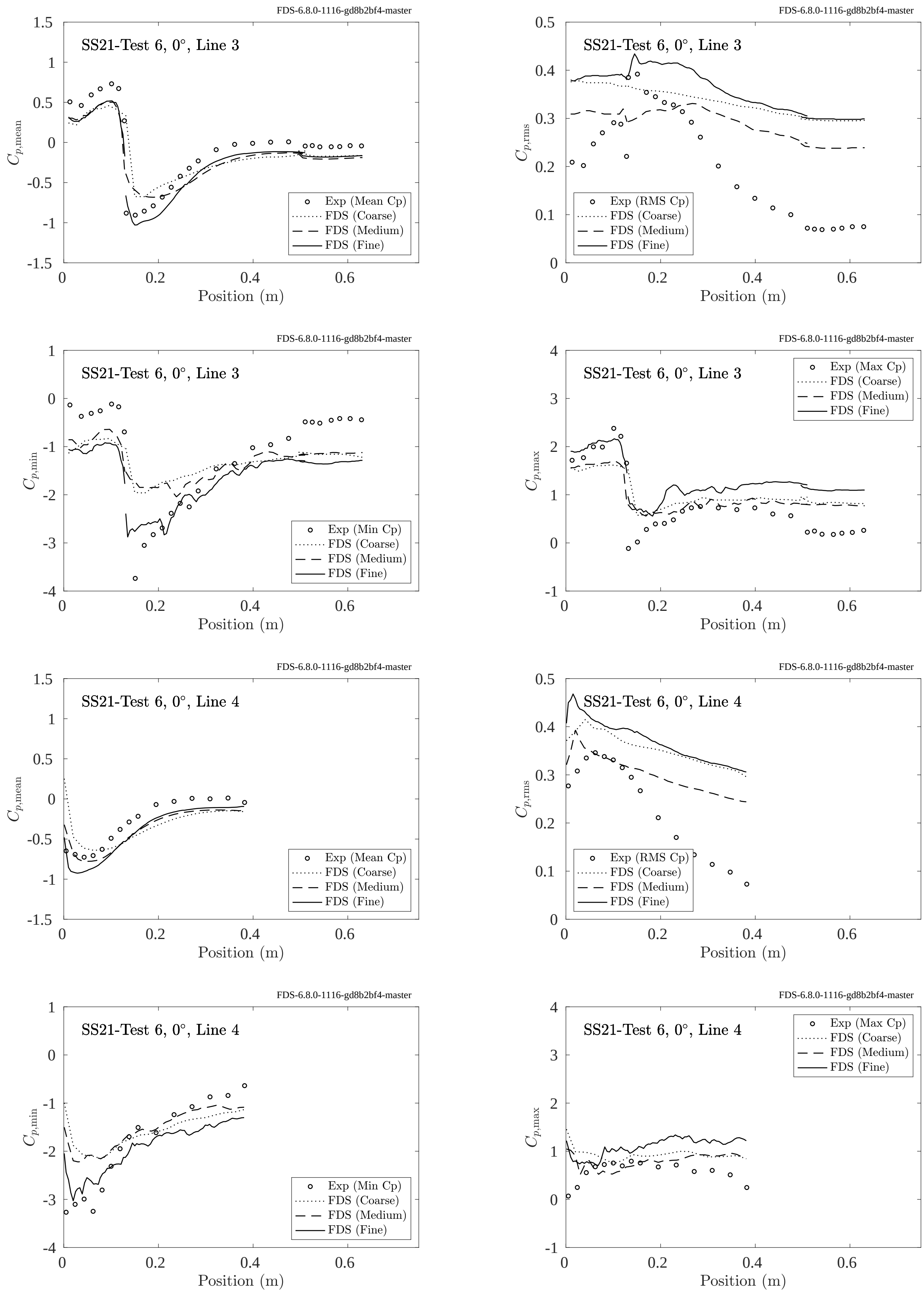


Figure 15.7: UWO Wind Tunnel, SS21-Test 6 pressure coefficients, 0° wind direction.

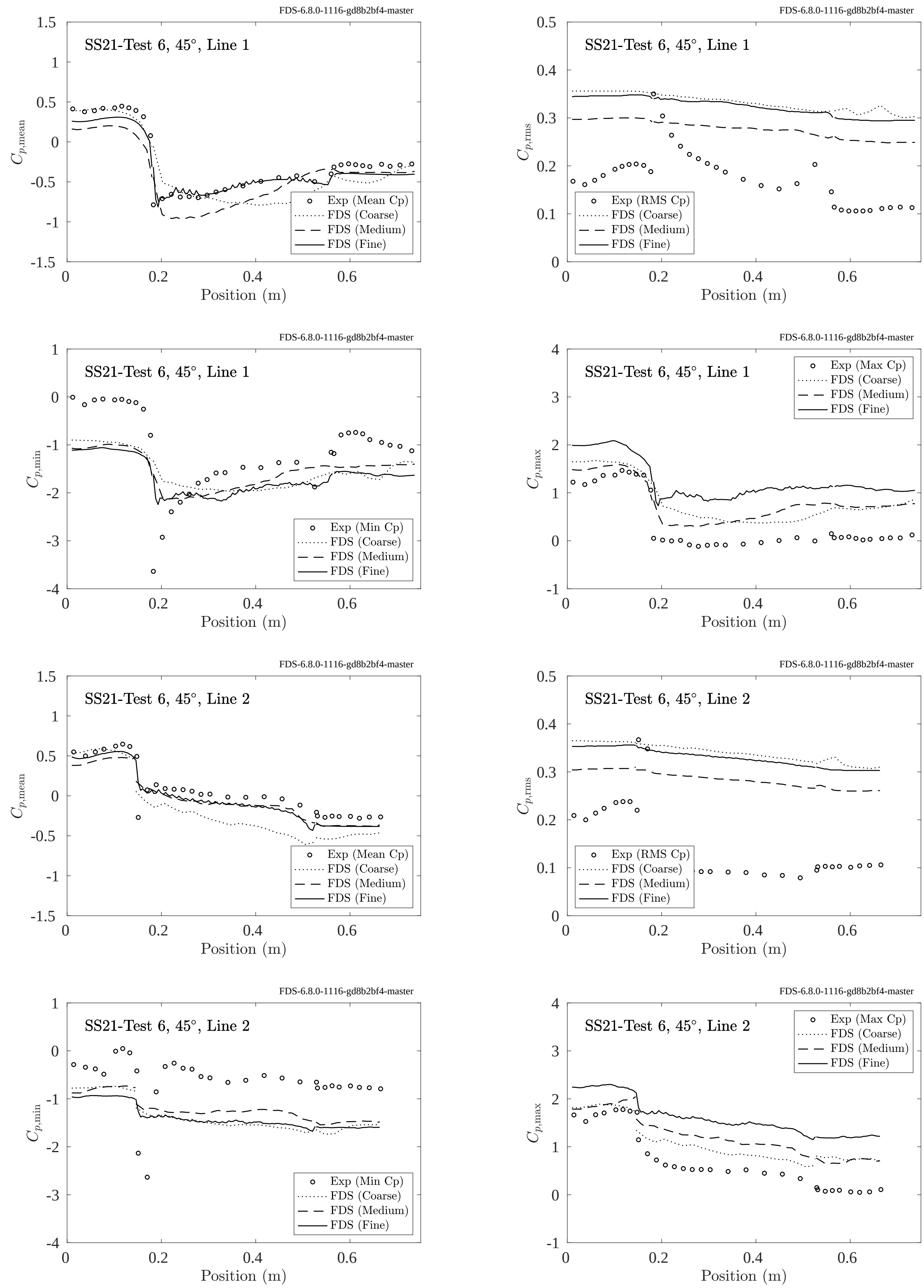


Figure 15.8: UWO Wind Tunnel, SS21-Test 6 pressure coefficients, 45° wind direction.

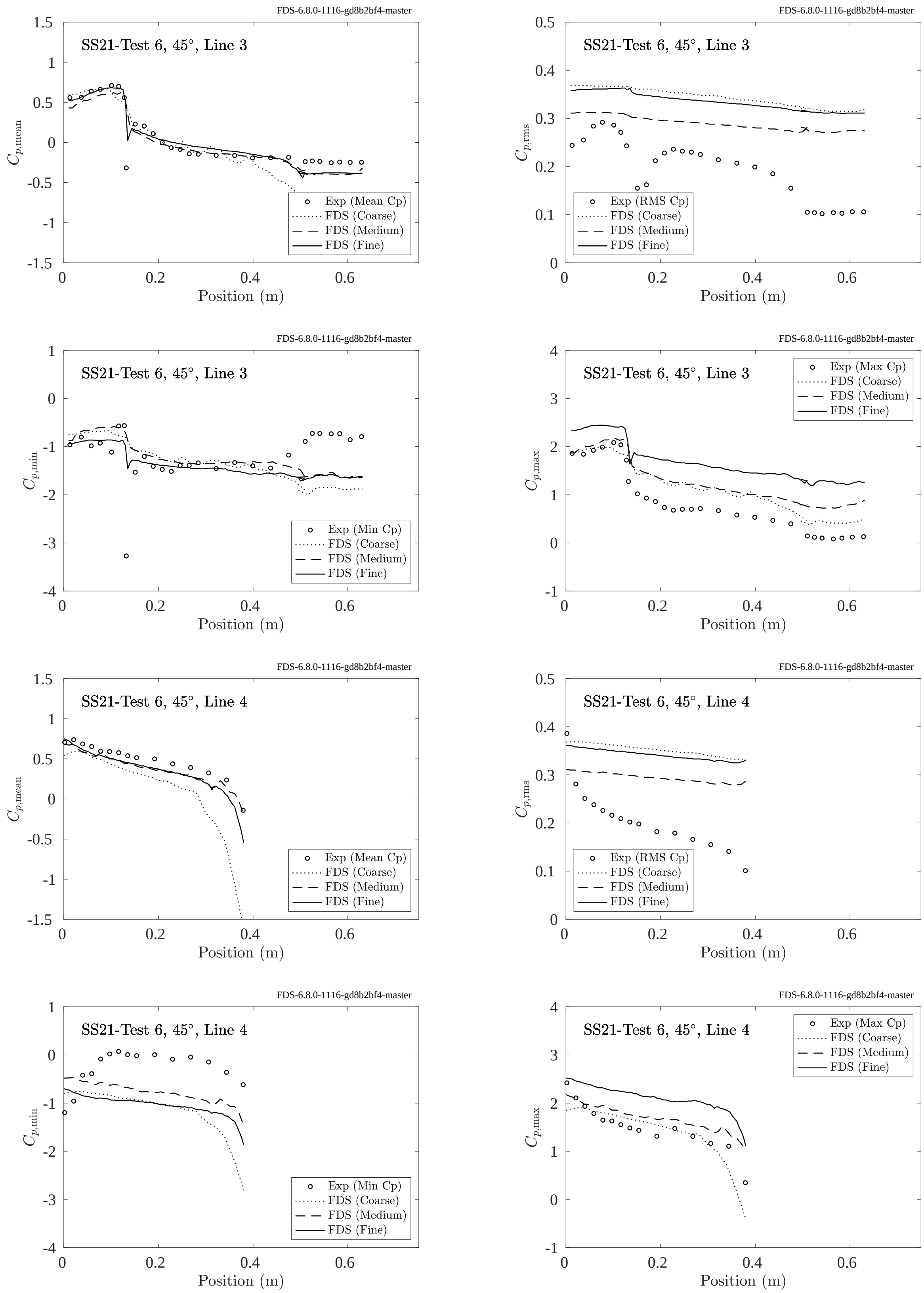


Figure 15.9: UWO Wind Tunnel, SS21-Test 6 pressure coefficients, 45° wind direction.

15.2 LNG Dispersion Experiments

Details of the numerical modeling of these experiments is found in Sec. 3.44.

Figure 15.10 through Fig. 15.13 display the measured velocity and temperature profiles, the corresponding Monin-Obukhov profiles that serve as initial and boundary conditions for FDS, and the resulting time-averaged profiles from the FDS simulations.

Figures 15.14–15.15 compare measured and predicted downwind concentrations of natural gas originating from spills of liquefied natural gas (LNG) on water. In each case, the measured values are short-time (1 s to 3 s) averages of sensors positioned in arcs at discrete distances downwind of the spill site. For each arc, the maximum value is chosen. The processing of the FDS results follows the same procedure. The sensors were generally located a few meters off the relatively dry, flat terrain.

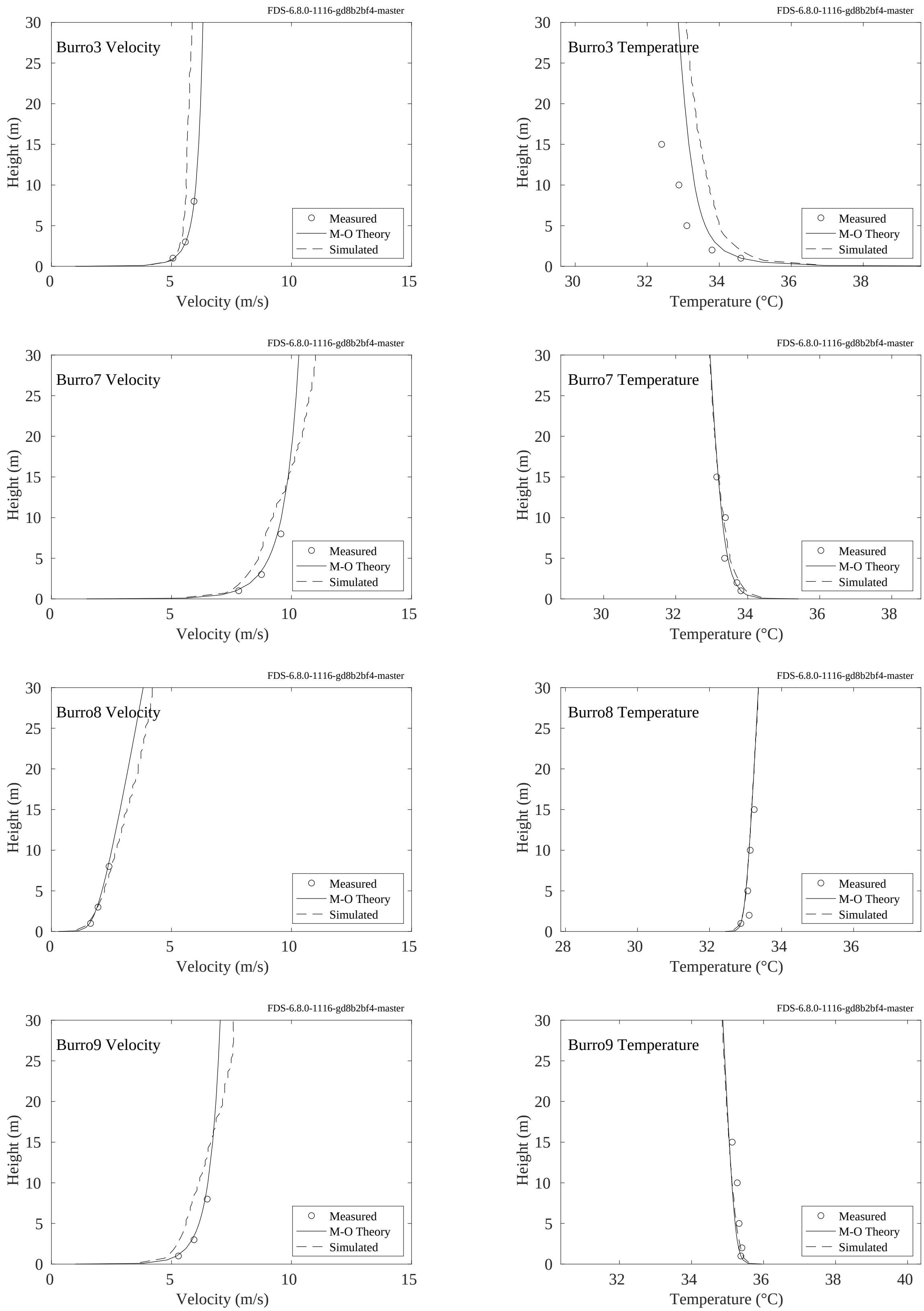


Figure 15.10: LNG Dispersion experiments, Burro velocity and temperature profiles.

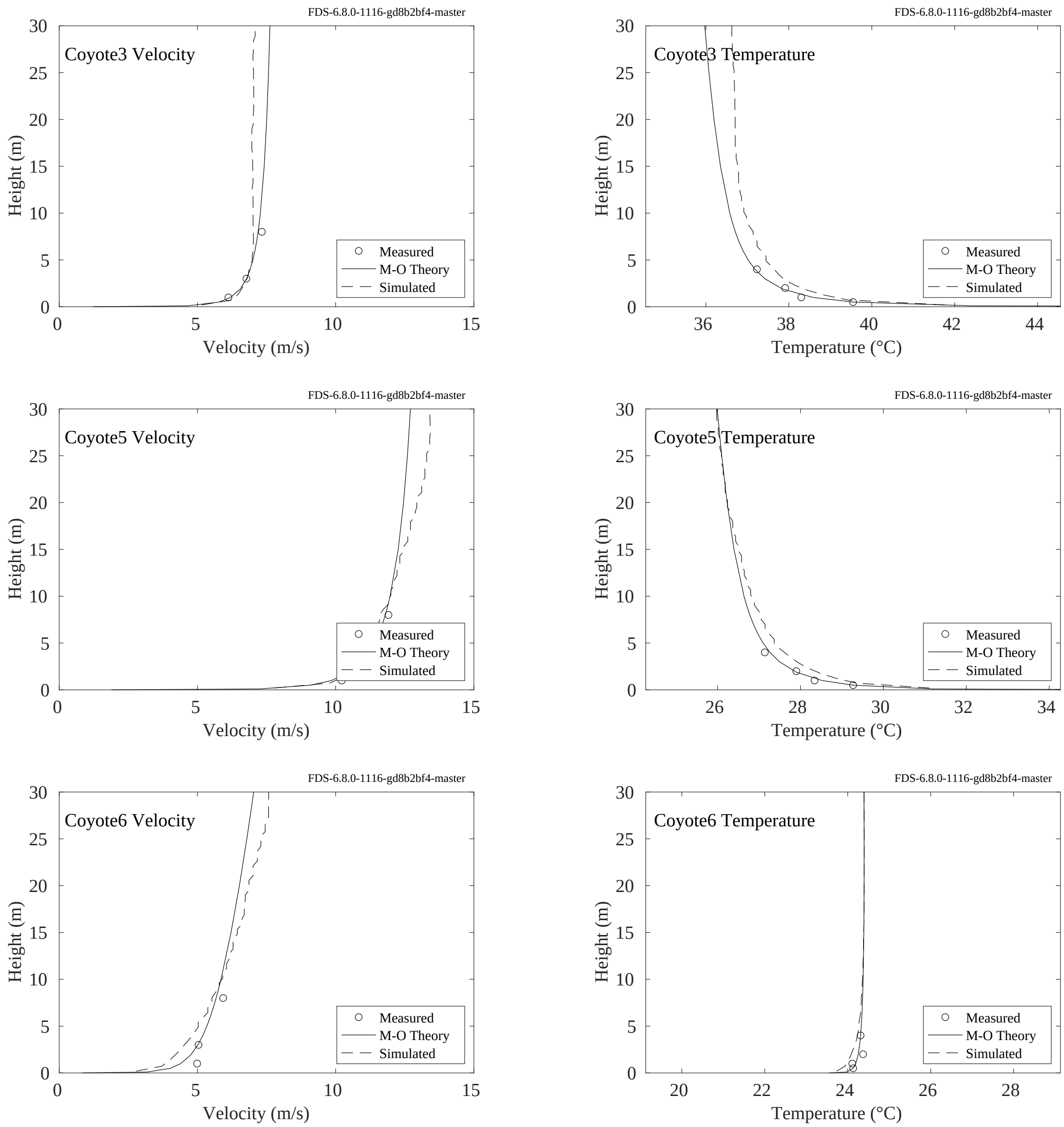


Figure 15.11: LNG Dispersion experiments, Coyote velocity and temperature profiles.

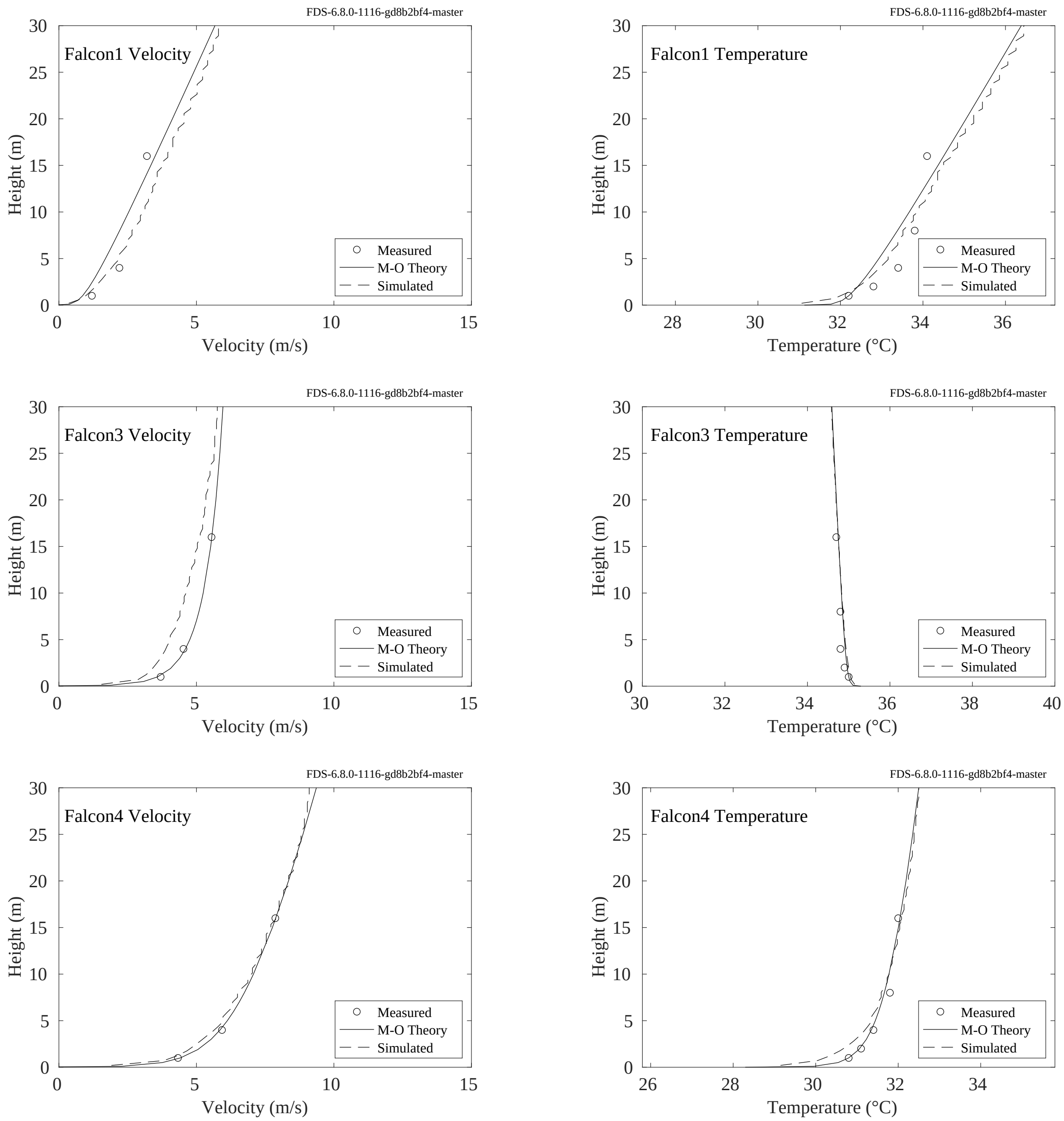


Figure 15.12: LNG Dispersion experiments, Falcon velocity and temperature profiles.

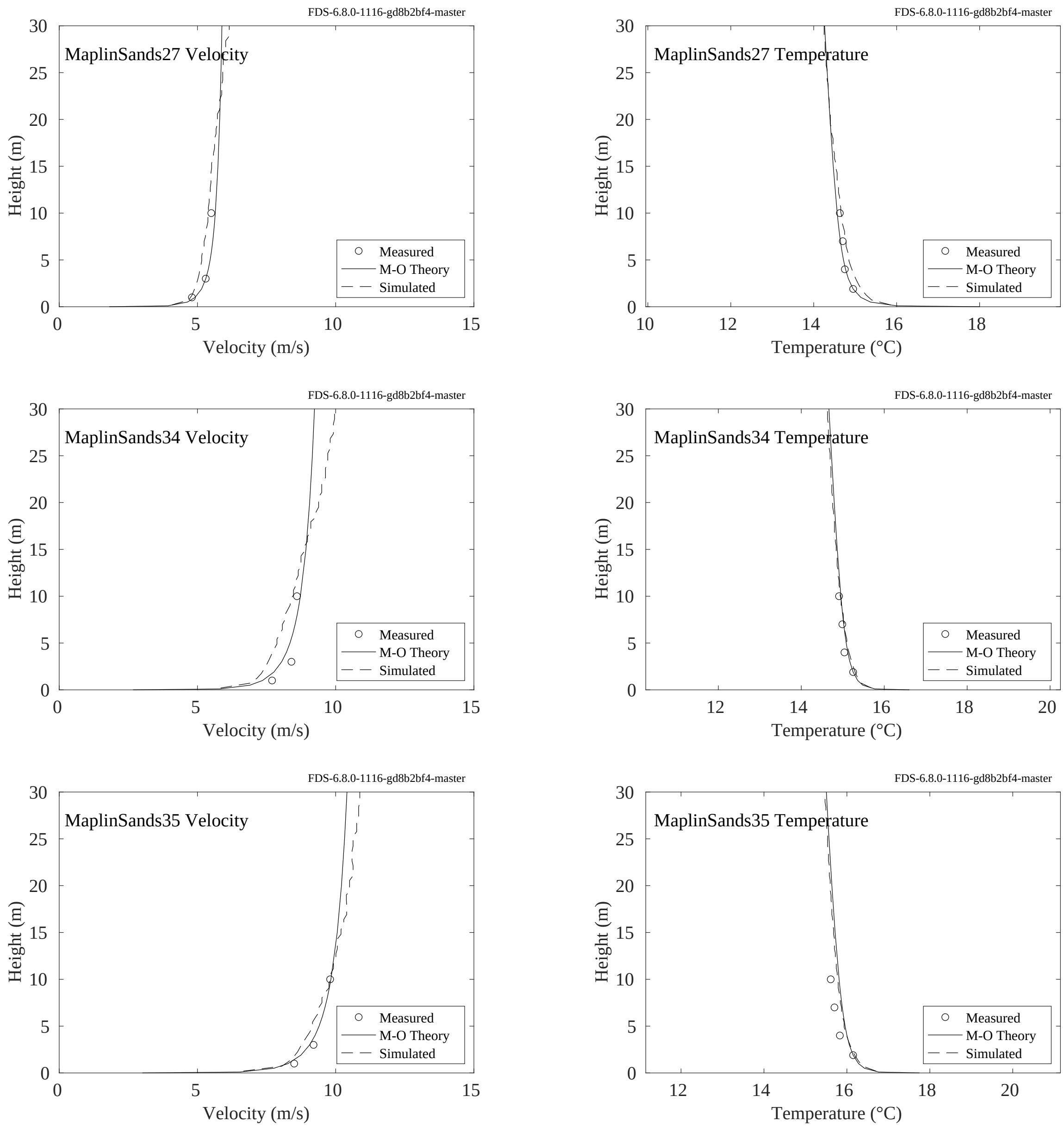


Figure 15.13: LNG Dispersion experiments, Maplin Sands velocity and temperature profiles.

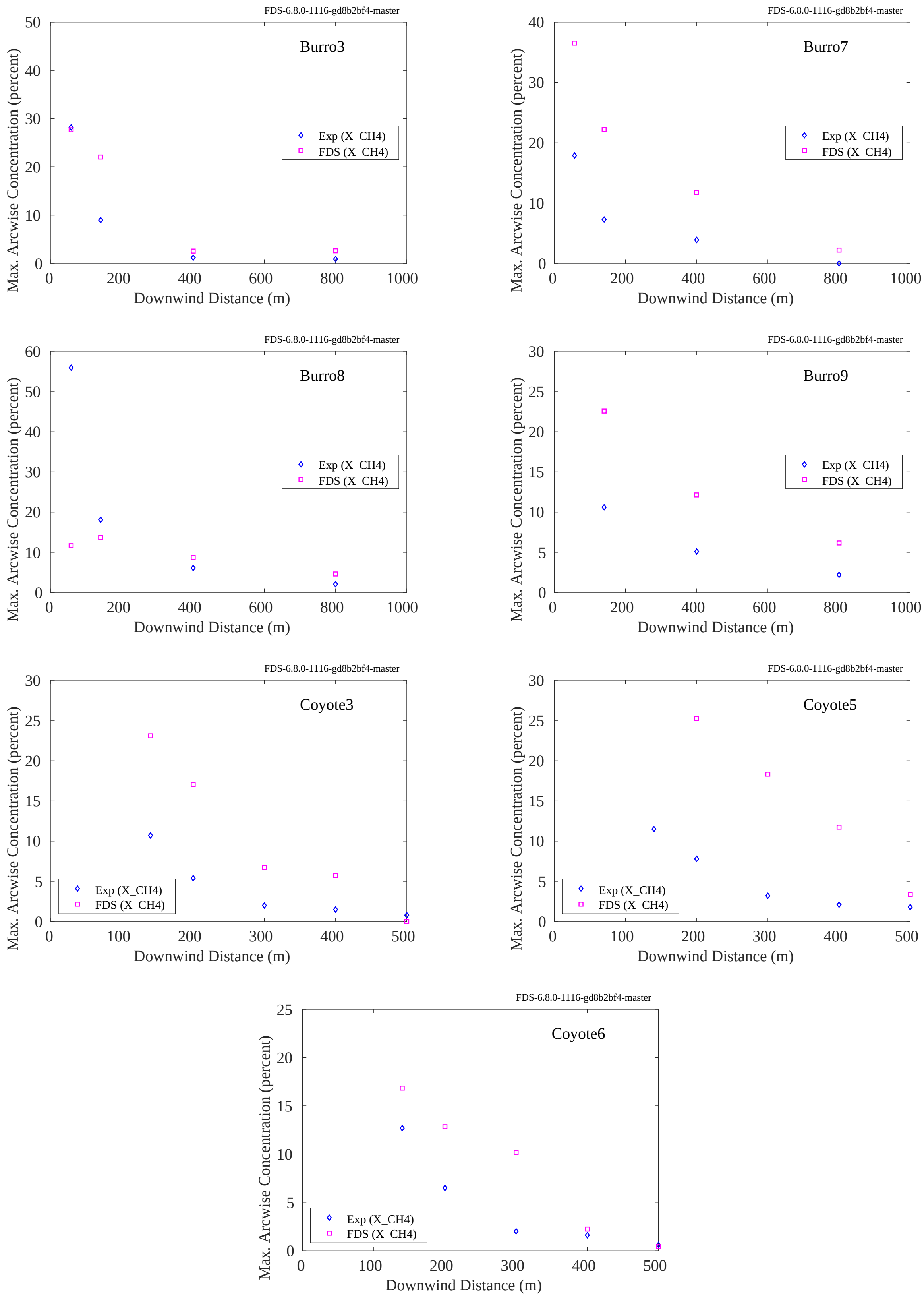


Figure 15.14: LNG Dispersion experiments, Burro and Coyote.

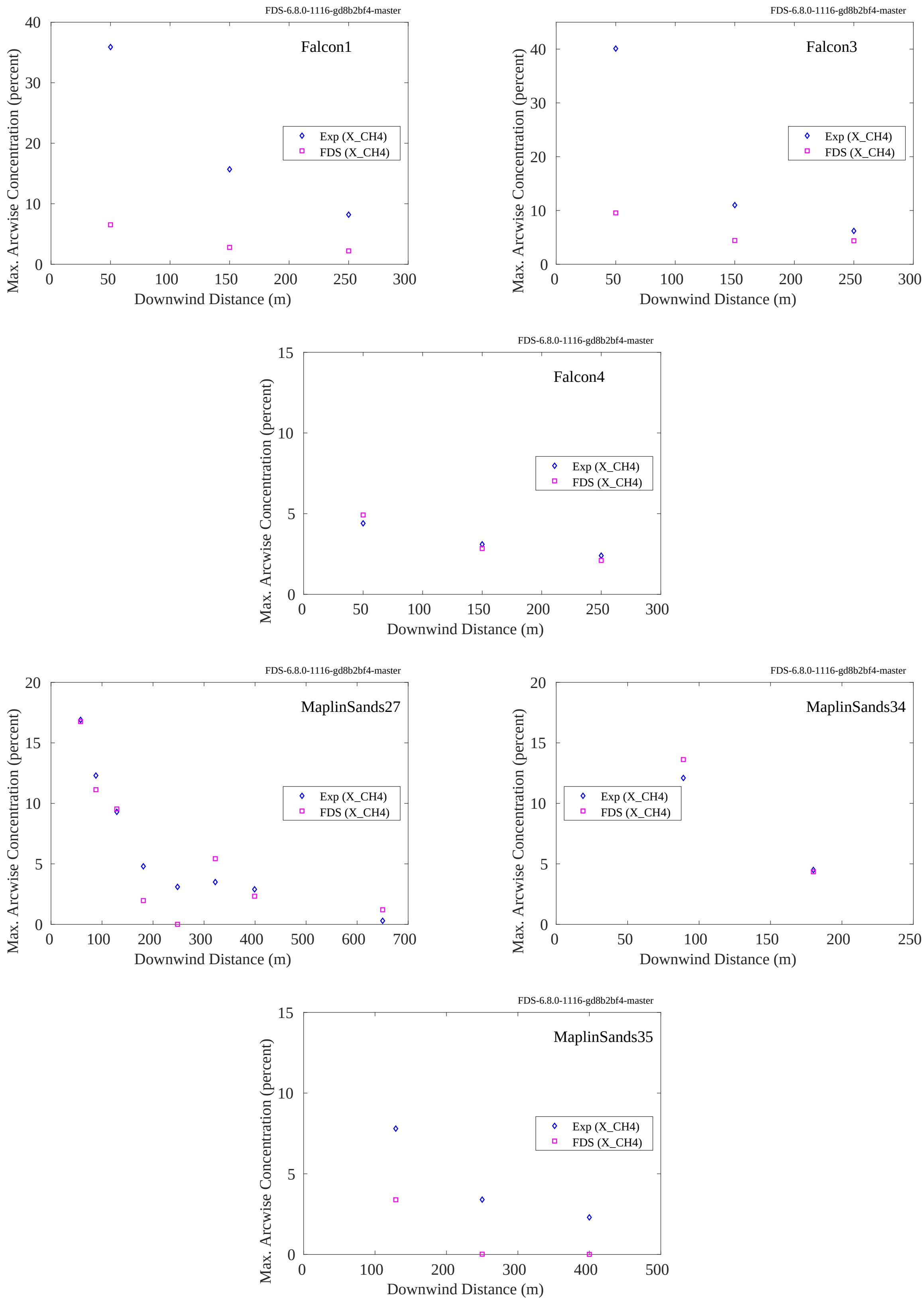


Figure 15.15: LNG Dispersion experiments, Falcon and Maplin Sands.

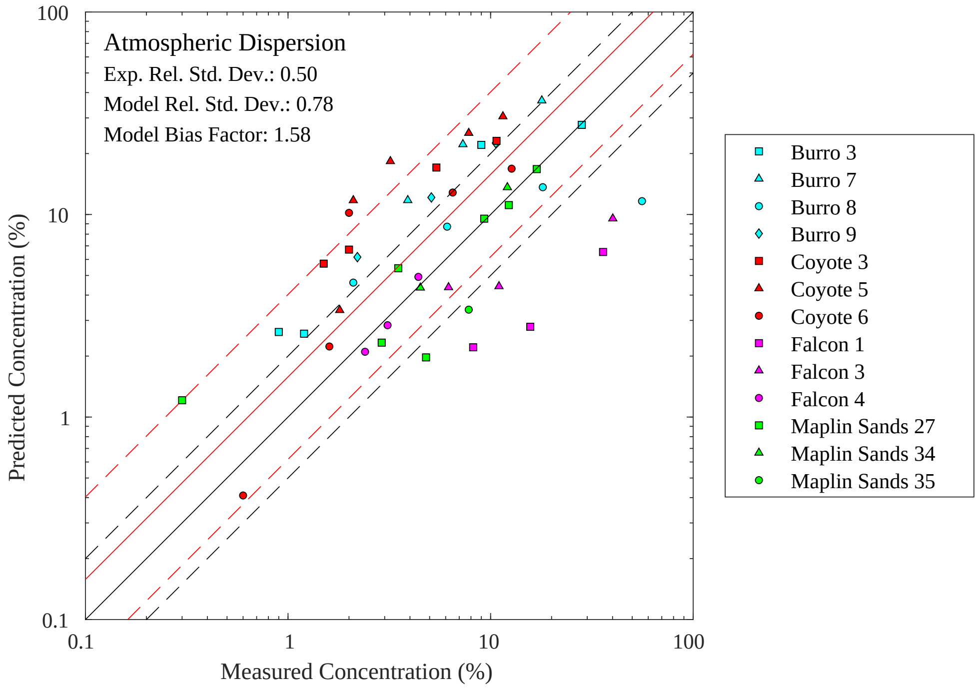


Figure 15.16: Summary of LNG Dispersion predictions. Note that the dashed black lines denote plus/minus a factor of two from the measured values. The red dashed lines represent two relative standard deviations about the solid red line, the model average.

15.3 Stack Emission Plume Rise

A common exercise in atmospheric dispersion modeling is predicting the plume rise height of stack emissions. In an example given by Stull [149], a $z_s = 75$ m stack emits SO_2 at a rate of 250 g/s with an exit velocity of $W_0 = 20$ m/s and temperature of $\Delta T = 180$ K above ambient ($T_0 = 293$ K) through an orifice with radius $R_0 = 2$ m. The wind speed is $U = 5$ m/s. Three cases are considered where the atmosphere is stably stratified with temperature gradients, $\mathrm{d}T/\mathrm{d}z$, of -4.8, -8.8 and 5.2 K/km. The expected equilibrium height is given by the empirical expression:

$$z_c = z_s + 2.6 \left(\frac{I_b U^2}{N_{BV}^2} \right)^{1/3} \approx \begin{cases} 290 \text{ m} & \text{Case 1} \\ 443 \text{ m} & \text{Case 2} \\ 224 \text{ m} & \text{Case 3} \end{cases} \tag{15.1}$$

where I_b is a buoyancy length scale given by

$$I_b = \frac{W_0 R_0^2 g}{U^3} \frac{\Delta T}{T_0} \approx 3.85 \text{ m} \quad \text{(all cases)} \tag{15.2}$$

and the Brunt-Väisälä frequency is given by:

$$N_{BV}^2 = \frac{g}{T_0} \left(\frac{\mathrm{d}T}{\mathrm{d}z} + \Gamma_d \right) \approx \begin{cases} 1.67 \times 10^{-4} \text{ s}^{-2} & \text{Case 1} \\ 0.334 \times 10^{-4} \text{ s}^{-2} & \text{Case 2} \\ 5.02 \times 10^{-4} \text{ s}^{-2} & \text{Case 3} \end{cases} \qquad \Gamma_d = 9.8 \times 10^{-3} \text{ K/m} \tag{15.3}$$

Notice that the exhaust rate of SO_2 has no role in the calculation of plume height because it is greatly diluted by hot air (or other exhaust products) exiting the stack at 20 m/s.

Figure 15.17 displays snapshots of the simulations, and Fig. 15.18 displays the comparison of FDS simulations with the empirical correlation. In the simulations, the plume height was taken as the location of the peak concentration of the SO_2 far downwind of the stack. The stack is approximated as a rectangular solid measuring 4 m by 4 m by 76 m. The grid surrounding stack is composed of 2 m cubes. The next grid to the right is 4 m, and the next is 8 m. The wind speed is fixed at 5 m/s, and the temperature is linearly stratified.

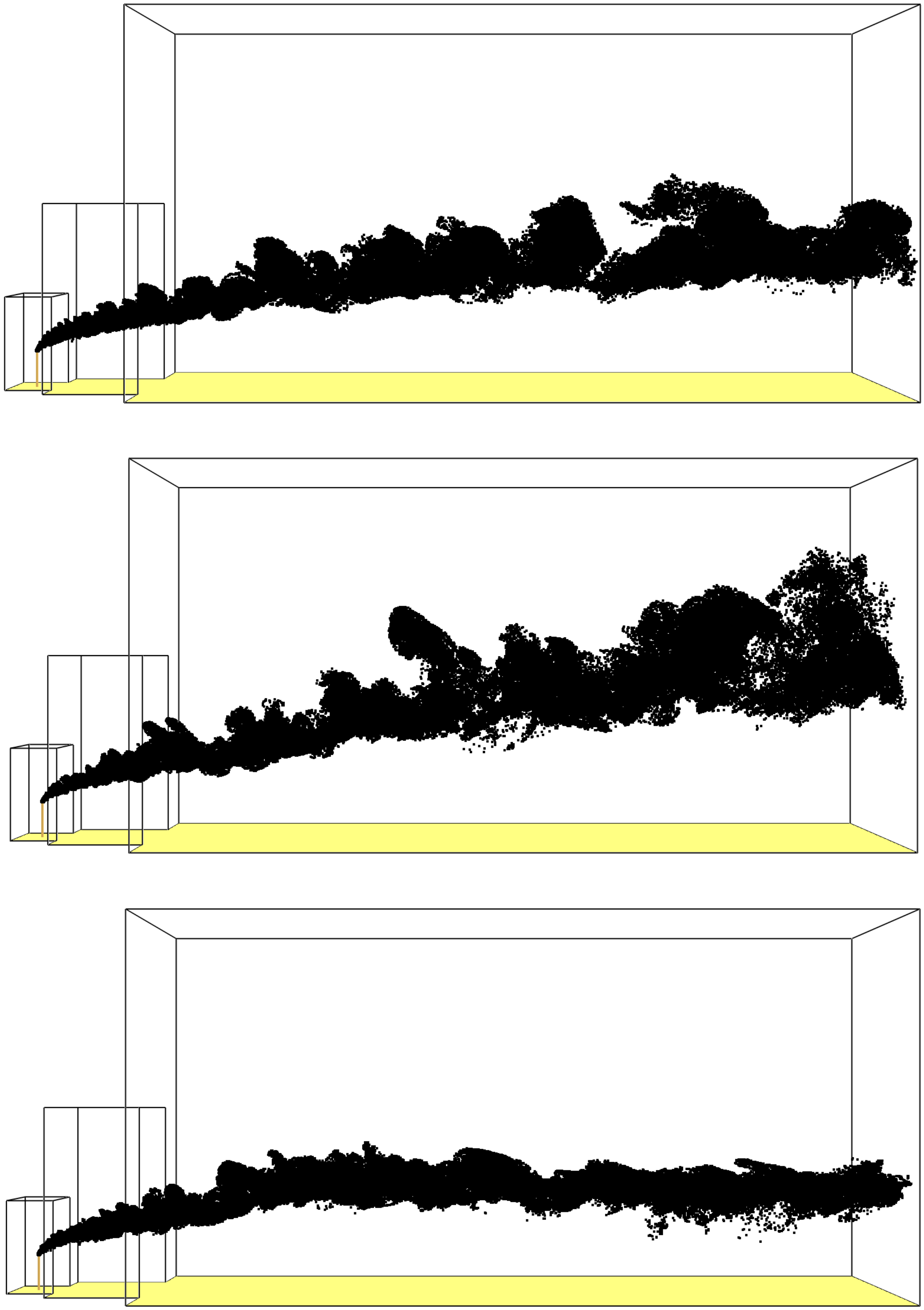
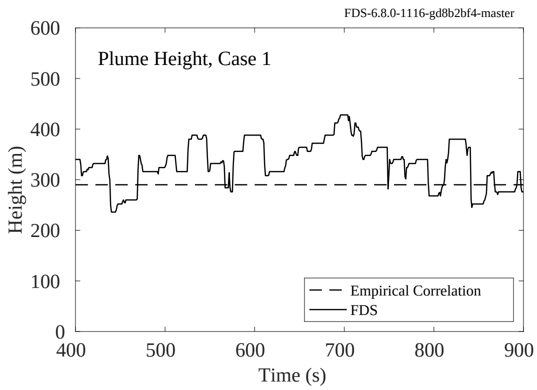
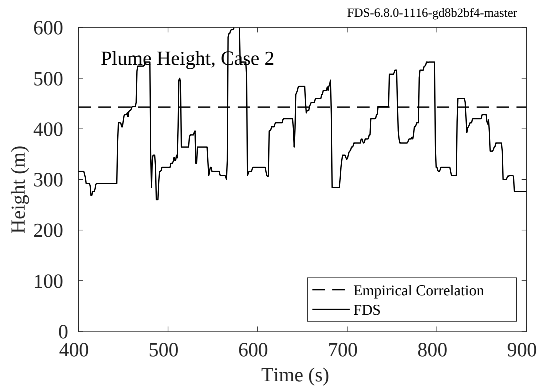
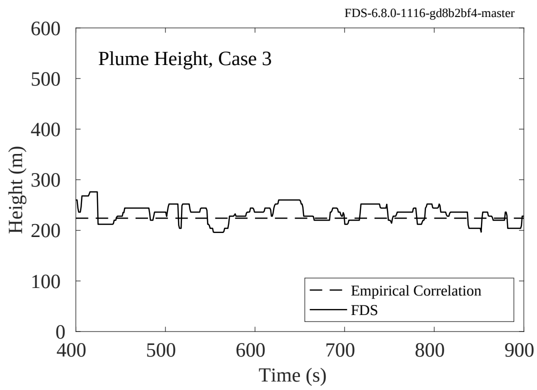


Figure 15.17: Snapshots of the simulations of plume rise. The largest computational domain is 800 m high and 1600 m long. The stack at left is 75 m high.







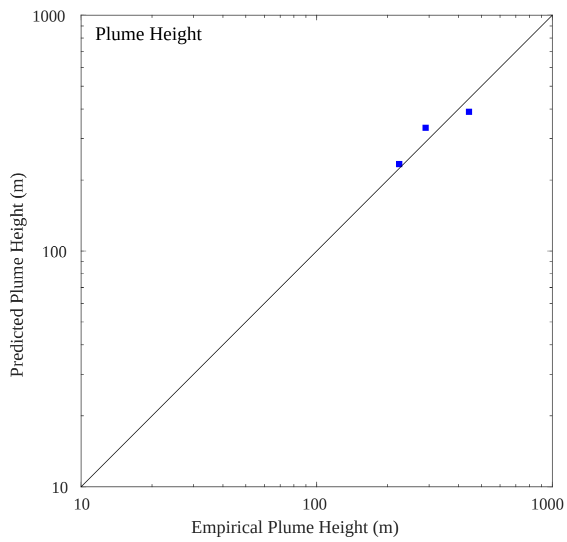


Figure 15.18: Atmospheric Dispersion, Plume Height results.

Chapter 16

Conclusion

16.1 Summary of FDS Model Uncertainty Statistics

Table 16.1 lists the summary statistics for the different quantities examined in this Guide. This is, for each quantity of interest, Table 16.1 lists the bias and relative standard deviation of the predicted values. It also lists the total number of experimental data sets on which these statistics are based, as well as the total number of point to point comparisons. Obviously, the more data sets and the more points, the more reliable the statistics.

For further details about model uncertainty and the meaning of these statistics, see Chapter 4.

Table 16.1: Summary statistics for all quantities of interest

Quantity	Section	Datasets	Points	$\widetilde{\sigma}_E$	$\widetilde{\sigma}_M$	Bias
HGL Temperature, Forced Ventilation	5.23	6	158	0.07	0.17	1.17
HGL Temperature, Natural Ventilation	5.23	17	323	0.07	0.13	1.04
HGL Temperature, No Ventilation	5.23	3	32	0.06	0.06	1.14
HGL Depth	5.23	15	280	0.05	0.08	1.05
Ceiling Jet Temperature	7.1.21	22	1061	0.07	0.13	1.04
Plume Temperature	6.1.13	14	297	0.07	0.23	1.05
Oxygen Concentration	9.1.10	13	279	0.08	0.17	0.97
Carbon Dioxide Concentration	9.1.10	13	274	0.08	0.14	1.00
Smoke Concentration	9.2.3	2	22	0.19	0.92	2.76
Compartment Over-Pressure	10.8	5	188	0.19	0.19	0.91
Target Temperature	11.2.10	11	1416	0.07	0.18	1.03
Surface Temperature	11.1.9	8	1127	0.07	0.18	1.08
Liquid Pool Surface Temperature	11.3.3	10	24	0.07	0.13	0.92
Target Heat Flux	12.2.16	16	1185	0.11	0.61	1.08
Surface Heat Flux	12.1.16	10	842	0.11	0.48	0.91
Velocity	8.15	12	375	0.08	0.19	1.01
Sprinkler Activation Time	7.2.1	6	273	0.06	0.16	1.01
Smoke Detector Activation Time	7.3	1	142	0.27	0.27	0.62
Smoke Detector Activation Time, Temp. Rise	7.3	1	142	0.32	0.32	1.21
Cable Failure Time	11.2.11	1	35	0.12	0.16	1.16
Sprinkler Actuations	7.2.2	3	38	0.15	0.30	1.10
Heat Release Rate	14.11	7	62	0.08	0.45	1.48

Quantity	Section	Datasets	Points	$\widetilde{\sigma}_E$	$\widetilde{\sigma}_M$	Bias
Scaling Heat Release Rate Per Unit Area	14.11	4	534	0.08	0.15	0.95
Burning Rate	14.11	2	34	0.08	0.40	0.91
Liquid Pool Burning Rate	14.11	8	54	0.08	0.27	1.46
Carbon Monoxide Concentration	9.5.7	8	120	0.19	0.55	1.00
Entrainment	6.4	2	87	0.06	0.06	1.14
Extinction Time	13.2.5	2	45	0.10	0.43	1.28
Species Concentration	9.6	1	126	0.08	0.15	0.97
Smoke Obscuration	9.2.4	1	18	0.15	0.15	1.05
Mass Flow Rate	12.128	1	40	0.08	0.09	0.91
Atmospheric Dispersion	15.2	13	47	0.50	0.78	1.58
Minimum Extinguishing Concentration	13.1.1	46	46	0.03	0.03	1.04
Flame Height	6.2.3	6	100	0.10	0.29	1.12
Flame Tilt	6.3	3	24	0.10	0.68	0.85
Rate of Spread	14.11	6	350	0.10	0.43	0.94
Condensation	12.7	6	101	0.12	0.32	0.73
Aerosol Deposition	9.3.2	2	88	0.12	0.50	1.06

16.2 Normality Tests

The histograms on the following pages display the distribution of the quantity $\ln(M/E)$, where M is a random variable representing the Model prediction and E is a random variable representing the Experimental measurement. Recall from Chapter 4 that $\ln(M/E)$ is assumed to be normally distributed. To test this assumption for each of the quantities of interest listed in Table 16.1, Spiegelhalter's normality test has been applied [404]. This test examines a set of values, $x_1,...,x_n$ whose mean and standard deviation are computed as follows:

$$\bar{x} = \sum_{i=1}^{n} x_i \quad ; \quad \sigma^2 = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2 \tag{16.1}$$

Spiegelhalter tests the null hypothesis that the sample x_i is taken from a normally distributed population. The test statistic, S, is defined:

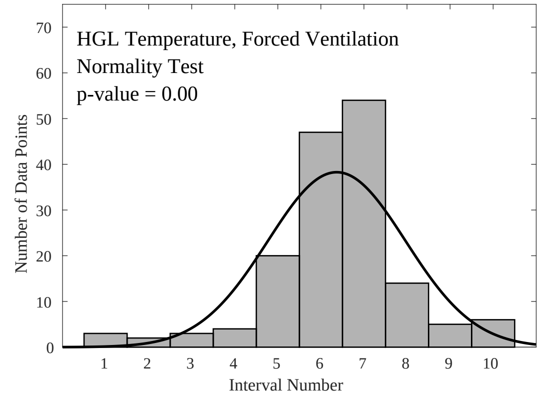
$$S = \frac{N - 0.73\,n}{0.9\,\sqrt{n}} \quad ; \quad N = \sum_{i=1}^{n} Z_i^2 \ln Z_i^2 \quad ; \quad Z_i = \frac{x_i - \bar{x}}{\sigma} \tag{16.2}$$

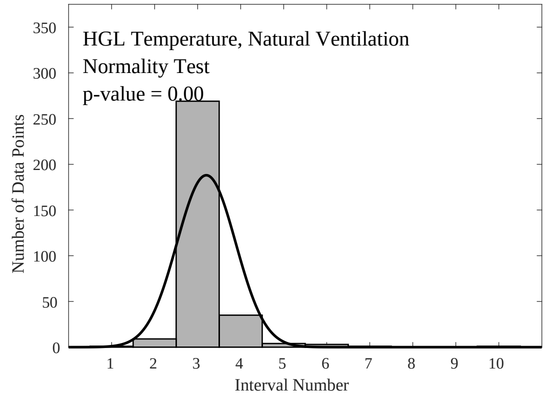
Under the null hypothesis, the test statistic is normally distributed with mean 0 and standard deviation of 1. If the p-value

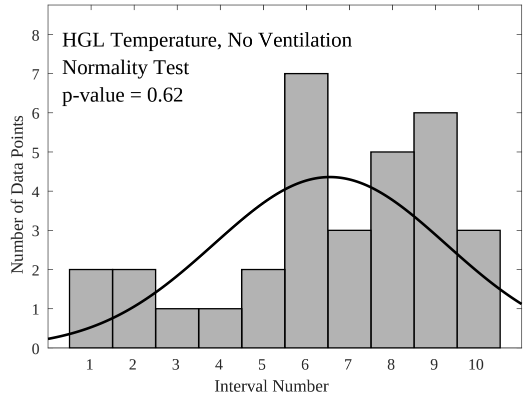
$$p = 1 - \left| \operatorname{erf}\left(\frac{S}{\sqrt{2}} \right) \right| \tag{16.3}$$

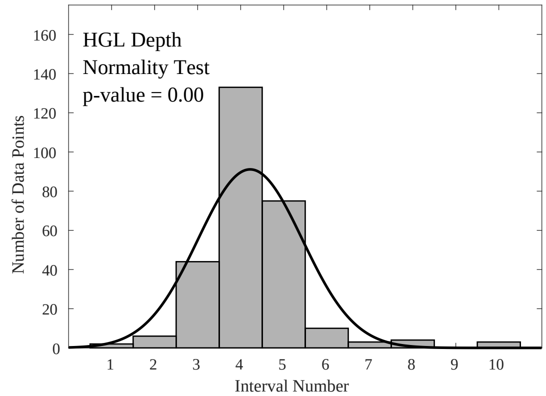
is less than 0.05, the null hypothesis is rejected.

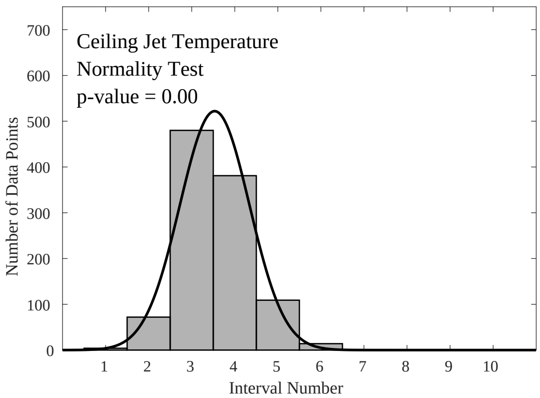
The flaw in most normality tests is that they tend to reject the assumption of normality when the number of samples is relatively large. As can be seen in some of the histograms on the following pages, some fairly "normal" looking distributions fail while decidedly non-normal distributions pass. For this reason, the p-value is less important than the qualitative appearance of the histogram. If the histogram exhibits the

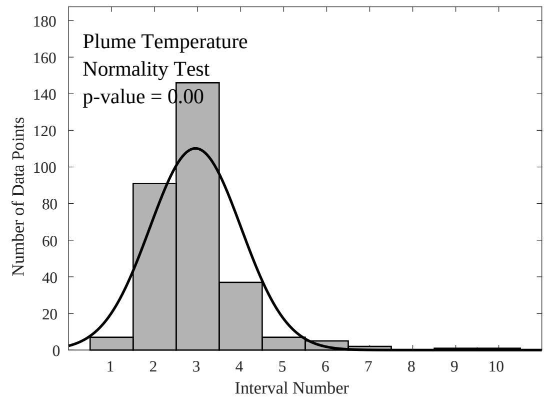

HGL Temperature, Forced Ventilation
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

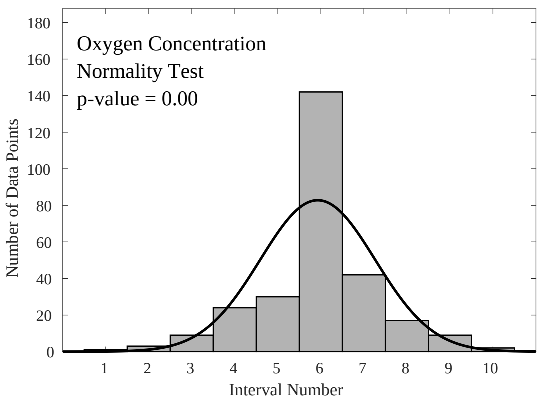

HGL Temperature, Natural Ventilation
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

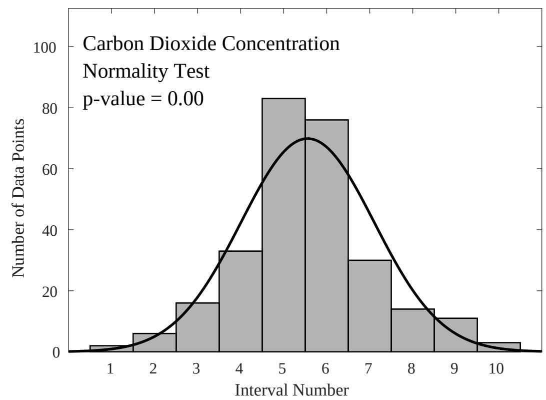

HGL Temperature, No Ventilation
Normality Test
p-value = 0.62
Number of Data Points
Interval Number

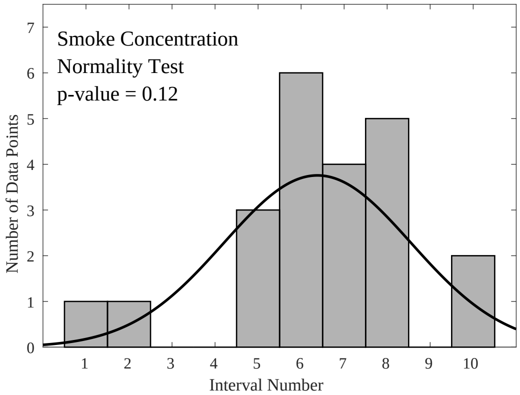

HGL Depth
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

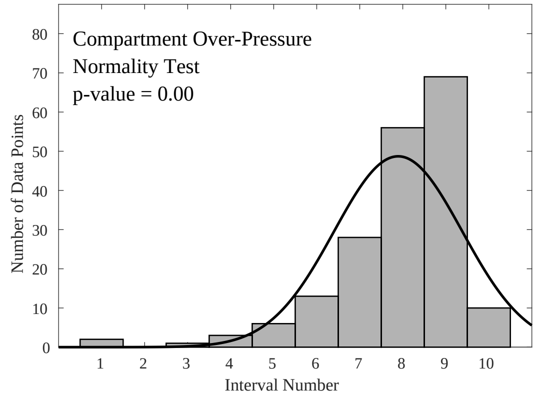

Ceiling Jet Temperature
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

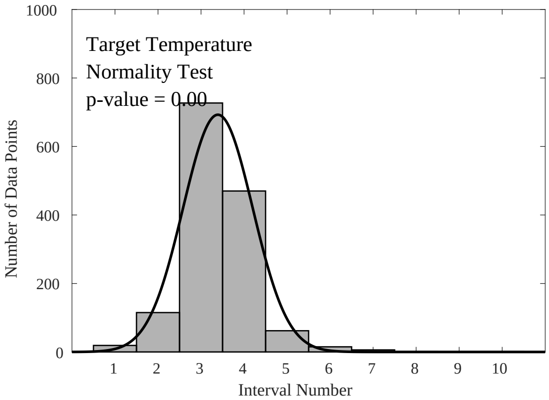

Plume Temperature
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

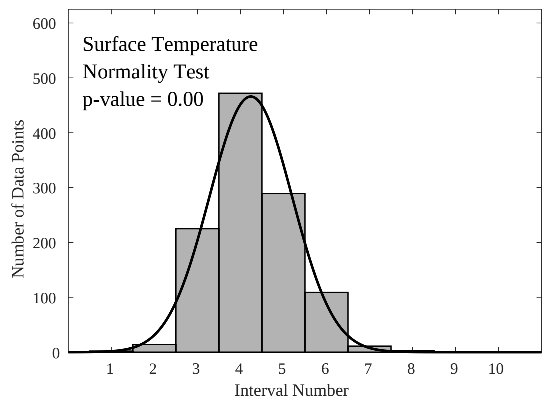

Oxygen Concentration
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

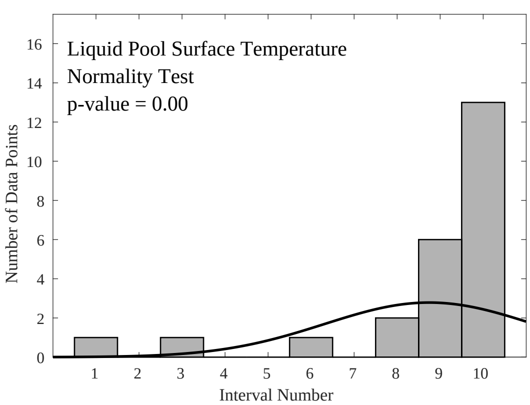

Carbon Dioxide Concentration
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

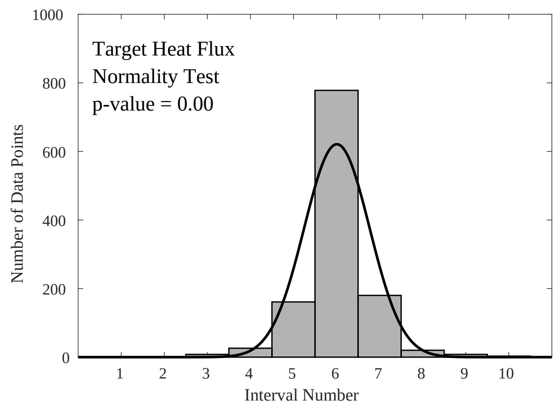

Smoke Concentration
Normality Test
p-value = 0.12
Number of Data Points
0 1 2 3 4 5 6 7
1 2 3 4 5 6 7 8 9 10
Interval Number

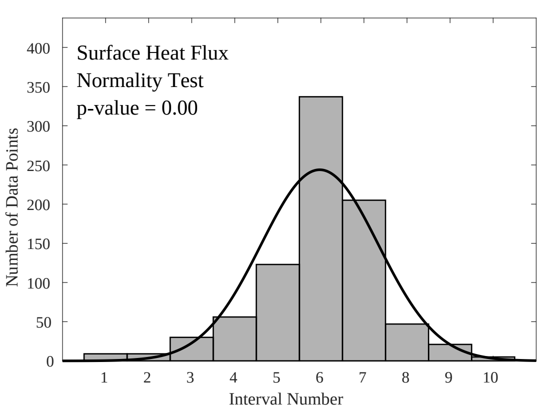

Compartment Over-Pressure
Normality Test
p-value = 0.00
Number of Data Points
0 10 20 30 40 50 60 70 80
1 2 3 4 5 6 7 8 9 10
Interval Number

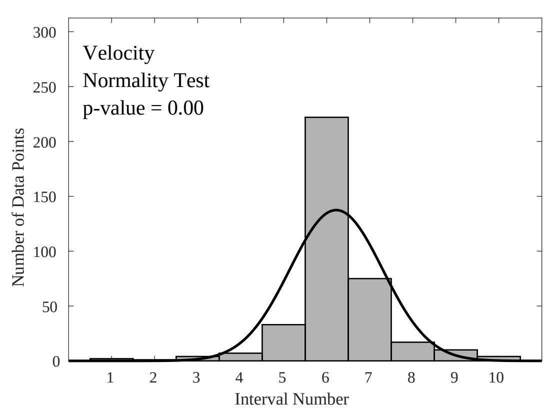

Target Temperature
Normality Test
p-value = 0.00
Number of Data Points
0 200 400 600 800 1000
1 2 3 4 5 6 7 8 9 10
Interval Number

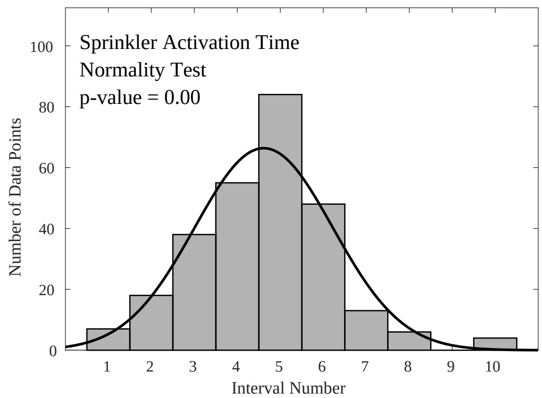

Surface Temperature
Normality Test
p-value = 0.00
Number of Data Points
0 100 200 300 400 500 600
1 2 3 4 5 6 7 8 9 10
Interval Number

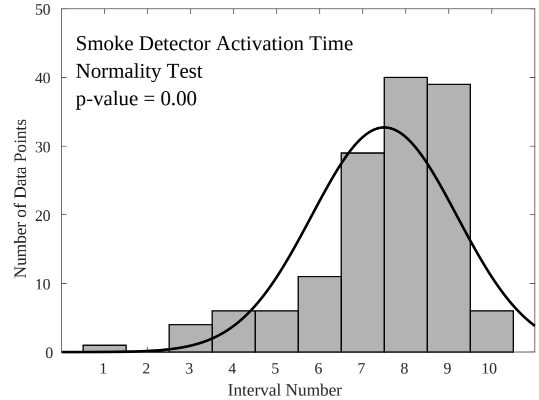

Liquid Pool Surface Temperature
Normality Test
p-value = 0.00
Number of Data Points
0 2 4 6 8 10 12 14 16
1 2 3 4 5 6 7 8 9 10
Interval Number

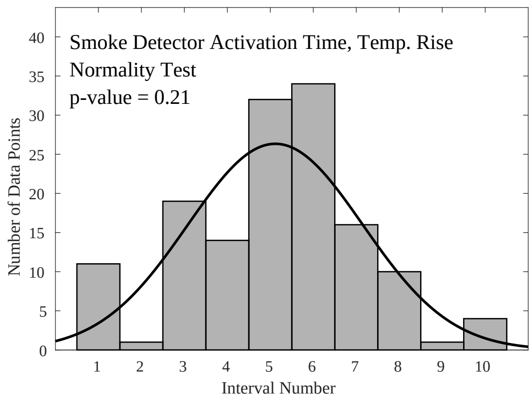

Target Heat Flux
Normality Test
p-value = 0.00
Number of Data Points
0 200 400 600 800 1000
1 2 3 4 5 6 7 8 9 10
Interval Number

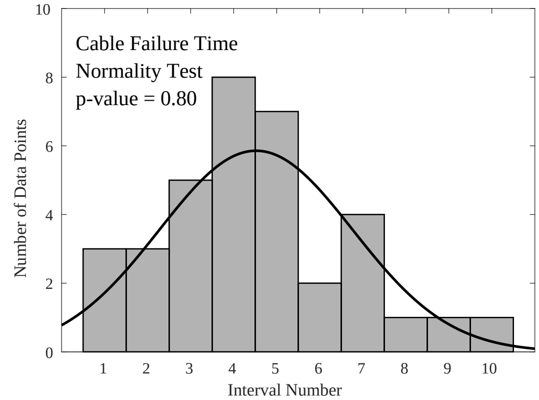

Surface Heat Flux
Normality Test
p-value = 0.00
Number of Data Points
0 50 100 150 200 250 300 350 400
1 2 3 4 5 6 7 8 9 10
Interval Number

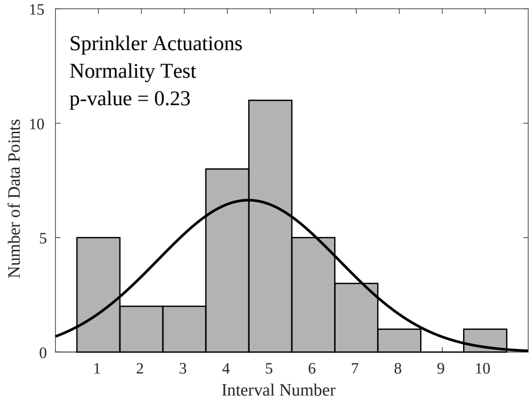

Velocity
Normality Test
p-value = 0.00
Number of Data Points
0 50 100 150 200 250 300
1 2 3 4 5 6 7 8 9 10
Interval Number

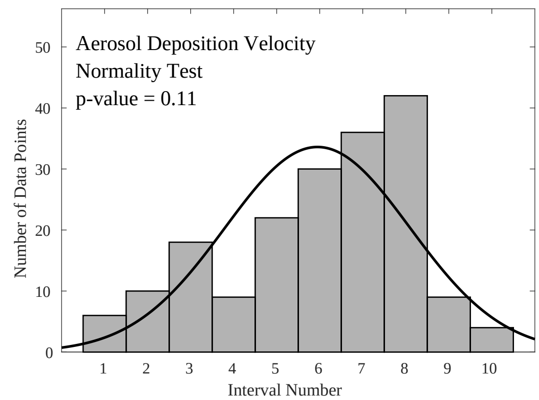

Sprinkler Activation Time
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

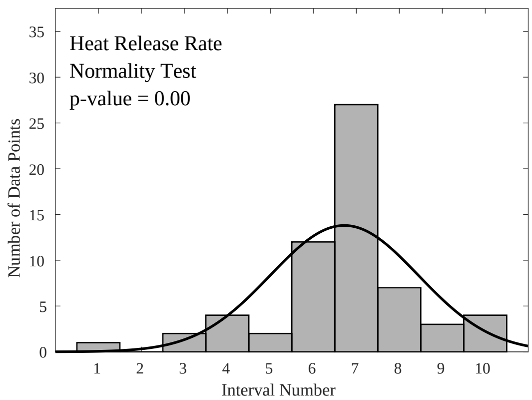

Smoke Detector Activation Time
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

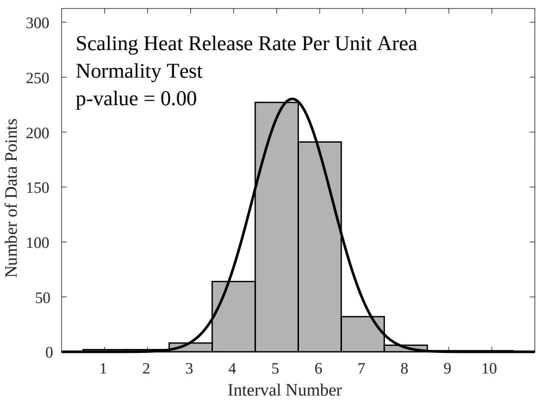

Smoke Detector Activation Time, Temp. Rise
Normality Test
p-value = 0.21
Number of Data Points
Interval Number


Cable Failure Time
Normality Test
p-value = 0.80
Number of Data Points
Interval Number


Sprinkler Actuations
Normality Test
p-value = 0.23
Number of Data Points
Interval Number


Aerosol Deposition Velocity
Normality Test
p-value = 0.11
Number of Data Points
Interval Number


Heat Release Rate
Normality Test
p-value = 0.00
Number of Data Points
Interval Number


Scaling Heat Release Rate Per Unit Area
Normality Test
p-value = 0.00
Number of Data Points
Interval Number

typical bell-shaped curve, this adds confidence to the statistical treatment of the data. If the histogram is not bell-shaped, this might cast doubt on the statistical treatment for that particular quantity.

16.3 Summary of FDS Validation Git Statistics

Table 16.2 shows the Git repository statistics for all of the validation datasets. For each dataset, the corresponding last changed date and Git revision string are shown. This indicates the Git revision string and date for which the most recent validation results for a given dataset were committed to the repository.

Table 16.2: Validation Git statistics for all data sets

Dataset	FDS Revision Date	FDS Revision String
MPI_Scaling_Tests	Apr 20, 2023	FDS-6.8.0-4-gd71a566-master
Memorial_Tunnel	Dec 1, 2023	FDS-6.8.0-1049-g2af029c-master
LEMTA_UGent_Pool_Fires	Dec 20, 2023	FDS-6.8.0-1110-gca57bb4-master
Arup_Tunnel	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
ATF_Corridors	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Atmospheric_Dispersion	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Backward_Facing_Step	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Beyler_Hood	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
BGC_GRI_LNG_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Bittern_Sprinkler_Experiments	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Bouchair_Solar_Chimney	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
BRE_Spray	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Bryant_Doorway	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
CAROLFIRE	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Casara_Arts_Ribbed_Channel	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Convection	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Crown_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
CSTB_Tunnel	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Cup_Burner	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
DelCo_Trainers	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Droplet_Evaporation	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Edinburgh_Vegetation_Drag	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FAA_Cargo_Compartments	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FAA_Polymers	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Fleury_Heat_Flux	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FM_Burner	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FM_FPRF_Datacenter	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FM_Parallel_Panels	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FM_SNL	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
FM_Vertical_Wall_Flames	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Hamins_Gas_Burners	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Harrison_Spill_Plumes	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Heskestad_Flame_Height	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Insulation_Materials	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Juelich_SETCOM	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
LLNL_Enclosure	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
LNG_Dispersion	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Loughborough_Jet_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master

Dataset	FDS Revision Date	FDS Revision String
McCaffrey_Plume	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NBS_Multi-Room	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Composite_Beam	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Deposition_Gauge	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Douglas_Firs	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_E119_Compartment	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_FSE_2008	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_He_2009	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_NRC_Corner_Effects	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_NRC	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_NRC_OLIVE-Fire	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Polymers	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Pool_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_RSE_1994	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_RSE_2007	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Smoke_Alarms	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Structure_Separation	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NIST_Vent_Study	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NRCC_Facade	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NRCC_Smoke_Tower	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
NRL_HAI	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Phoenix_LNG_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Pool_Fires	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
PRISME	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Purdue_Flames	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Ranz_Marshall	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Restivo_Experiment	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Sandia_Methane_Burner	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Sandia_Plumes	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Shell_LNG_Fireballs	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Sippola_Aerosol_Deposition	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Smyth_Slot_Burner	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
SP_AST	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
SP_Wood_Cribs	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Steckler_Compartment	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
SWJTU_Tunnels	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Turbulent_Jet	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UL_NFPRF	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UL_NIJ_Houses	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UL_NIST_Vents	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Ulster_SBI	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UMD_Line_Burner	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UMD_Polymers	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
USCG_HAI	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
USFS_Catchpole	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master

Dataset	FDS Revision Date	FDS Revision String
USFS_Corsica	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
USN_Hangars	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
UWO_Wind_Tunnel	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Vettori_Flat_Ceiling	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Vettori_Sloped_Ceiling	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
VTT	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
VTT_Sprays	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Waterloo_Methanol	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
WTC	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Wu_Bakar_Tunnels	Dec 22, 2023	FDS-6.8.0-1116-gd8b2bf4-master
Montoir_LNG_Fires	Jan 12, 2024	FDS-6.8.0-1236-g3b16ca3-master
Heated_Channel_Flow	Jan 19, 2024	FDS-6.8.0-1273-g2ca4b8a-master
NIST_NRC_Parallel_Panels	Jan 19, 2024	FDS-6.8.0-1273-g2ca4b8a-master
UMD_SBI	Jan 19, 2024	FDS-6.8.0-1273-g2ca4b8a-master
Moody_Chart	Feb 7, 2024	FDS-6.8.0-1423-g2082ad5-master
LEMTA_Spray	Feb 16, 2024	FDS-6.8.0-1522-gf593119-master
Scaling_Pyrolysis	Feb 19, 2024	FDS-6.8.0-1530-gd4ec585-master
CSIRO_Grassland_Fires	Mar 8, 2024	FDS-6.8.0-1656-gaa02179-master
OMP_Scaling_Tests	Apr 5, 2024	FDS-6.9.0-92-g9743202-master

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